

# Local net gridlock

BY MARY PETROSKY  
West Coast Correspondent

First in a two-part series.

If you've ever lived in a rapidly growing town, you've suffered through traffic snarls at corners formerly kept clear by a lone policeman or a sole traffic signal. You sit in your car, waiting and wondering when new roads will be built.

Although their frustration level may not be as high as that of drivers trapped

Continued on page 33

## MANAGEMENT MANEUVERS

# Net clampdown cuts costs

Firm takes charge of telecom system to save \$1m.

BY MICHAEL FAHEY  
Staff Writer

SHREVEPORT, La. — After taking a hard look at its communications network in the wake of divestiture, Arkla Gas Co. instituted a series of tough cost-busting moves that may save the firm as much as \$1 million by the end of 1987.

Early in 1984, the energy company based here reorganized its telecommunications department, instituted tight network controls and set in motion a series of cost-cutting measures, including auditing of

phone bills and more efficient routing of telephone circuits.

"After divestiture came about, our people said, 'Hey, if we manage this monster, we can probably save some money, rather than just paying the phone bill,'" explained James Bray, communications analyst for Arkla Gas, a wholesale and retail supplier of natural gas to Louisiana, Arkansas and parts of the Southwest.

Working under communications manager Roger Tinsley, Bray, who joined Arkla eight years ago as an electronic technician, See Pipeline page 8

# NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 3, NUMBER 17 JUNE 30, 1986

## CONTROLLER CRITIQUE

# IBM's well-connected device

BY JOHN DIX  
Senior Editor

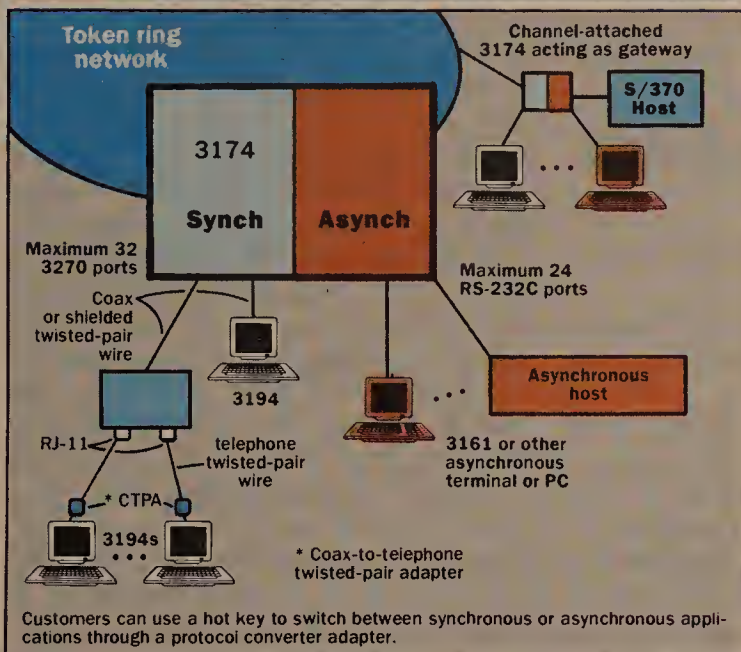
Although IBM's recently announced replacement for its 3274 controller fell short of lofty, long-held industry expectations, the device offers a useful array of connectivity options that broaden the functionality of IBM's widely used 3270 family of peripherals.

The 3174 Subsystem Control Unit simplifies installation and ongoing maintenance through the use of multipurpose connectors and the ability to support many types of wire.

The 3174 can also be connected to IBM's Token-Ring Network and, in another first for IBM's controller line, the 3174 enables customers to support asynchronous Ascii devices.

See Controller page 39

## Connectivity options for new IBM controller



## INFORMATION INNOVATIONS

# User bucks PBX trend

Firm employs Northern Tel SL1 solely for data needs.

BY MARGIE SEMILOF  
Senior Writer

LITTLETON, Colo. — Martin Marietta Aerospace Corp. has turned conventional private branch exchange practice on its head by devoting a Northern Telecom, Inc. SL1 voice/data PBX strictly to data applications.

While most users typically purchase PBXs solely for voice purposes, Martin Marietta's research and development laboratory here took this unusual step in order to network its heterogeneous mix of computers and local networks. Those networks include several Ethernets, Apple Computer, Inc. Appletalk local networks, IBM Personal Computer networks and Novell, Inc. Netware systems.

The Littleton facility houses Martin Marietta's center for government-contracted software development projects. Douglas Strand, director of Martin Marietta's computer lab, said federal contract requirements are stringent and call for highly detailed documentation. By linking the various systems, the PBX helps speed the laborious tasks of software and documentation development.

According to Strand, the company installed the PBX because of its ability to mesh with other networking tools, its expandable switching capabilities and the company's desire to take advantage of existing twisted-pair wiring within its facilities.

"We were not necessarily looking for the lowest cost item," Strand said. "We wanted a switch with unlimited capacity, and most data switches have a limited number of lines."

"My cost per line is probably higher than if I used a smaller switch," Strand added. "We average about \$700 to \$1,000 per line. However, those costs may drop when the PBX is fully configured and all ports are connected."

The Martin Marietta facility is constantly adding to the PBX's 500 active digital lines. The SL1 accommodates See Marietta page 42

## NETWORK LINE

### News

AMS '86 attendees lined up to view a 13-vendor minifactory demonstration of advanced manufacturing equip-

ment. But lookers won't soon become buyers. Page 2.

Plunging oil revenue forces Alaska to slash \$2.2 million annually from its telecom budget. Page 2.

Harvard preps for a test of Bellcore's metro net. Page 3.

The future of Centrex hangs on upcoming industry developments. A recent study says the wrong conditions could spell doom for Centrex. Page 4.

U.S. District Court Judge Harold Greene grants a waiver allowing RBOC Ameritech to manufacture communications equipment overseas. Page 7.

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From cave drawings to complex networks, communications has always been driven by standards and integration. Page 28.

► AMS '86 CONFERENCE

# CIM steals show, but users still wary

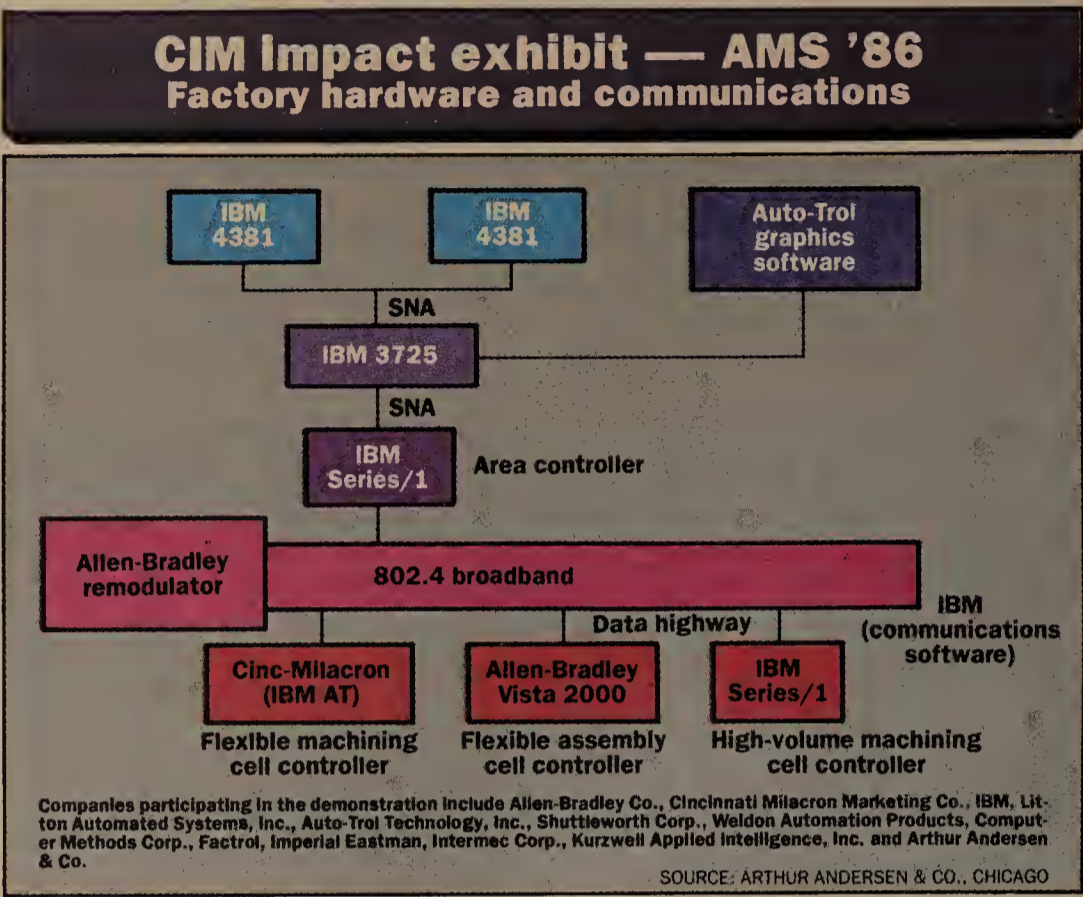
*"Method of future" too costly, impractical for current needs.*

BY BOB WALLACE  
Senior Writer

CHICAGO — Many users claimed they will not be able, for at least the foreseeable future, to implement the integrated manufacturing equipment featured in a live, 13-vendor minifactory demonstration held at last week's Advanced Manufacturing Systems '86 conference and exposition here.

Arthur Andersen & Co., a Chicago-based Big Eight accounting firm with a large contingent of manufacturing consultants, helped organize and set up Impact. Impact was a 10,800-square-foot minifactory integrating so-called state-of-the-market, or currently available, factory equipment into a single manufacturing system (see chart at right). Arthur Andersen officials claimed the various systems highlighted in the demonstration and the effort required to integrate them cost roughly \$11 million.

The demonstration stole the show, attracting several hundred conference attendees during the first day alone. The project was designed to help dispel the widely held belief that computer integrated manufacturing (CIM) is a concept that has yet to be put into practice. The CIM manufacturing methodology calls for the integra-



tion of all factory functions within a single facility.

Although several factory equipment users claimed the Impact minifactory was a valuable educational experience, they also said manufacturing systems in their factories would not be integrated for at least another several years.

User comments regarding the im-

practicality of integrating manufacturing functions within their plants cast a dark shadow on the future prospects of CIM, which has been widely touted as a solution to U.S. manufacturers' production woes.

A.J. Walter, president of Walter Tool & Manufacturing, Inc., an Elk See **Impact** page 7

► COST CUTTING

# Alaska chops expenses

*Telecom budget trimmed by \$2.2 million.*

BY BOB WALLACE  
Senior Writer

ANCHORAGE, Alaska — A projected \$1 billion decrease in oil revenues has forced Charles Hickman to slash the operating expenses of

this state's largest telecommunications network by roughly \$2.2 million annually.

Hickman is director of the Learn Alaska Network, a satellite-based educational services network that provides some 556,000 residents of the state's 250 permanent communities with voice, data and video

services. As part of the state's telecommunications cost-cutting steps, the lease of one of two satellite transponders the network uses to distribute its educational programming will be terminated tomorrow. The drastic decline in revenues has also forced the state to lay off eight members of the network's 16-member television programming staff.

"The state projected it would lose \$1 billion in oil revenues over an 18-month period beginning in January [1986]," Hickman explained. "We doubt there will be any more cuts in network operating

See **Alaska** page 7

► LINKING LANS

# Users build on bridges, gateways

BY MARGIE SEMILOF  
Senior Writer

*Second in a three-part series.*

The road to internetworking is being built with a diverse collection of bridges and gateways.

The task of bridging local networks is relatively simple. Bridges link similar networks using the same protocols. For example, a bridge could be used to connect one Ethernet-type local net to another. The bridging task is implemented mostly through hardware. Bridges possess the intelligence either to route data along one net or transparently shuttle it to another without protocol conversion.

Bridges connect networks at the basic link level of the International Standards Organization's Open Systems Interconnect (OSI) model. Therefore, although users can have many implementations of the IEEE 802.3 local-area network standard on the same physical medium, they cannot connect networks using different architectures. For instance, a Xerox Corp. XNS workstation could not link transparently to a Digital Equipment Corp. Decnet workstation through a bridge.

In contrast to bridges, gateways are software-intensive and provide internetwork multiprotocol translation, so users can access information on local-area networks with dissimilar architectures. For example, a user may link an IBM Token-Ring Network to a 3Com Corp. Ethernet-type network. When data travels from the Token-Ring through the gateway, it queues up and — like any other piece of information on the Ethernet — contends for access using the Ethernet scheme rather than the Token-Ring scheme.

The task of tying networks via gateways is more complex than the job of bridging similar networks. According to Eric Killoran, president of Andover, Mass.-based Hyatt Research Corp., the gateway market may see a sudden surge if users decide to link their existing networks with IBM's Token-Ring Network local-area net.

"Many users have large investments in non-IBM networks, such as Ethernet or Decnet," he said. "They will not want to throw away that investment."

Although gateways provide connections that satisfy the need to link unlike networks, their use may be limited to specific communications functions. Users can add optional packages to their gateway products that add functionality, such as IBM 3270 terminal emulation, LU 6.2 protocol conversion or Disoss document distribution.

Kim Myhre, vice-president of See **Bridges and gateways** page 8

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## ► FIBER OPTICS

# Prototype Bellcore net put to test

*Harvard University, Nynex team up to implement metropolitan net to tie Ethernet systems at four locations.*

BY NADINE WANDZILAK  
Staff Writer

CAMBRIDGE, Mass. — Harvard University, in conjunction with Nynex Service Co., is preparing to test an experimental fiber-optic metropolitan-area network that will tie together Ethernet networks at four locations.

The single-mode fiber-optic network, which operates at 10M bit/sec, was developed last year by Bell Communications Research (Bellcore) and is reportedly capable of transmitting data between buildings within a 50-km radius.

The metropolitan-area net will link Ethernet networks at computer centers within the university's Aiken Computation Laboratory, Harvard College Observatory and Harvard Medical School, as well as Massachusetts General Hospital. The project will be funded by Nynex.

The observatory, Aiken laboratory and Mass General are scheduled to cut over to the metropolitan net on Oct. 1; the Medical School's cutover is scheduled for Dec. 1. The system will be tested for 12 months from the final cutover.

Nynex, which is considering carrying the network as a commercial product, picked Harvard as a test site because the university has multiple locations within a single metropolitan area.

The company was also looking for a communications user whose networks employ Transmission Control Protocol/Internet Protocol (TCP/IP), according to Robert Roy, network and planning manager in Harvard's Office for Information Technology. TCP/IP is a protocol designed to optimize internetwork traffic.

Bellcore will collect and analyze operational data throughout the trial, and the company will issue a report to Nynex at the end of the experiment. New England Telephone & Telegraph Co., the Nynex operating company serving Harvard, will operate and maintain the network. Cable installation started at the three school sites and two New England Telephone central office switch facilities in May, according to Nagappa Pattanashetti, manager of network planning at Nynex.

Roy said there was significant enthusiasm at Harvard to participate in the test, because it will give people the opportunity to experiment more with networking and to see how they can extend the networks they already have.

"Our interest is to learn as much about network development and management as we can from this experience, so we can carry that forward into the development of our own networks," Roy said.

One major fiber-optic Ethernet network was implemented earlier

this year at Harvard. "We are working on additional points on that network," Roy said. "As part of our long-range plan, we are looking to fiber-optic technologies for a major portion of our future high-speed networking requirements."

Bellcore has already tested the backbone network in a laboratory environment, according to Pattanashetti. "But it is not marketable yet," he said. "It cannot be tariffed

immediately. This test is a step in the evolution process of bringing a metropolitan-area net to market."

Some 500 users will work with the Harvard metropolitan net initially, Pattanashetti said. However, that number could grow, depending on how much users like the new network and how comfortable they feel using it.

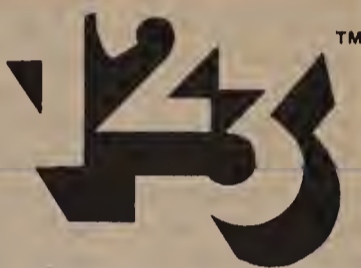
At Nynex's expense, Bellcore is modifying existing distributed

switching nodes and developing software for use in the Harvard metropolitan net.

Nynex sees metropolitan networks as a precursor to wideband applications with Integrated Services Digital Networks. Metropolitan network architectures, such as the one employed in this trial, are modular and can be expanded or reduced quickly with little or no change in fiber facilities.

Harvard's long-term communications planning is continuing, despite the presence of the metropolitan net. "We're working as though there were no [metro net]," Roy said. The university will continue with its plans to seek proposals this fall for a universitywide network. □

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## ► WIRING OPTIONS

# Centrex wire ill-suited for Token-Ring Network

*Analysts caution users against the pair.*

BY JOHN DIX  
Senior Editor

Although Centrex customers implementing IBM's Token-Ring Network could save on installation costs by using existing spare telephone wire, the practice may not be advisable due to the lack of cable documentation, variances in Centrex wire quality and the threat of electrical interference.

When IBM announced the Token-Ring Network last October, the company said it could be installed on a concurrently announced non-shielded version of its Cabling System or existing telephone wire that complied with IBM physical and electrical requirements.

Centrex systems, like most other telecommunications systems, are installed with spare wire pairs that can, theoretically, be used to support the Token-Ring. Centrex users include some of the largest businesses — companies that stand to save the most by finding ways to avoid installing new wire to support networks. Some are considering the Centrex wire option.

This alternative, however, may not be available to customers whose inside wiring still belongs to the local telephone company.

But even where possible, using spare wiring to support the Token-Ring usually does not make sense,

analysts report. "Depending on when the Centrex was wired, the grade and quality of the wire to the desk will rarely, if ever, turn out to be consistently good enough to service a Token-Ring Network," said Jerry Eisen, president of Office Sciences International, Inc., a consultancy in Iselin, N.J.

Centrex wire is typically of the same gauge as that required by IBM, 22 or 24 AWG, but differs in other respects. The bulk of Centrex wire, for example, includes cables containing 24 pair nontwisted wire strands that support AT&T 1A2 key systems. IBM specifies use of twisted-pair wire.

Even if the wire complies with IBM requirements, lack of proper cable documentation may render it useless. "It's not very likely that the telephone company is going to be able to provide you with accurate cable records," said Christopher Davis, director of telecommunications services for Rexnord, Inc., a Milwaukee-based diversified manufacturing company listed in the Fortune 500. "Without good cable records, the chances of fouling something up are great."

Centrex wiring is often a "jumble of spaghetti," said John Powers, a consultant with Telecom Management Corp., a consulting firm in Dedham, Mass. "Nobody seems to know exactly where and

how connections are established." Besides making it hard to install a network, the wire mess drives up the cost of ongoing maintenance. "Technicians earning \$75 to \$150 per hour can spend the majority of their time trying to figure out how two devices or ports are tied together," Powers said.

Some newer Centrex systems may actually be adequately installed and documented to support IBM's Token-Ring. If this is the case, electrical considerations must then be taken into account.

If a few wire pairs are picked out of a 24-pair cable for Token-Ring use, it may be necessary to ground the remaining pairs at one or both ends, according to Michael Hurwicz, a consultant with Telco Research Corp., a Nashville-based consulting company. If the unused pairs are not grounded, data on the network pairs may be corrupted by induction and electric noise problems.

Users thinking of supporting both Centrex wire and IBM's Type 3 Cabling System wire should also consider whether telephone-type wire will support speeds higher than the Token-Ring's current 4M bit/sec in the future.

IBM has certified use of standard twisted-pair wire at speeds up to but not beyond 4M bit/sec, but the company has also openly discussed the possibility of 16M bit/sec token nets. Thus, Centrex wire use or installation of non-shielded Type 3 cable may be outdated by future versions of the network.

Eisen from Office Sciences summed it up: "I can't imagine anyone making an investment in Token-Ring and not making sure the wire is kosher."

## ► CENTRAL OFFICE SERVICES

# Centrex's fate hangs in the balance

BY JIM BROWN  
New Products Editor

MORRISTOWN, N.J. — The future prosperity of Centrex hinges on regulatory and technological developments expected to unfold within the next five years, according to a study released by Probe Research, Inc., here.

One key to Centrex's health is the outcome of ongoing efforts to loosen regulatory reins that control how the Bell operating companies can offer Centrex services. The second is how quickly the BOCs can implement new central office-based technologies such as digital switches and function-rich software.

The study's author, Allan Tumolillo, expects Centrex to continue losing users with 1,000 or more central office lines to on-site private branch exchanges until 1990. But Centrex will still be a force in the small — 100 lines or less — and medium-line markets.

"Almost every large user we surveyed was considering migrating from Centrex to a PBX," Tumolillo said.

The study notes that while in-service Centrex lines dropped from

five million in 1983 to 4.9 million in 1985, the Centrex customer base jumped from 12,000 in 1983 to 16,400 in 1985, primarily due to the addition of small to medium customers.

One reason Centrex is suffering is because current government regulations prohibit the BOCs from offering enhanced services, manufacturing and selling integrated customer premises equipment and offering service outside their local access and transport areas.

Those prohibitions force large, geographically dispersed users to negotiate separate agreements with various regional BOCs, each of which may offer Centrex packages at different prices. Thus, to some large users, a PBX has been a more palatable alternative.

However, if the BOCs get regulatory relief from the Federal Communications Commission and can integrate voice and data at the central office, then Centrex will become more attractive to the large user, Tumolillo said.

The study predicts that the total number of commercial Centrex lines will fall to 4.47 million by 1990. If the BOCs get regulatory re-

lief and implement technological advances, however, that number could grow to 5.54 million lines by 1995. In the absence of those factors, the study predicts there will be only 4.17 million lines in use by 1990 and 4.44 million by 1995.

"If the BOCs get everything they want, Centrex could become a very powerful product, and there is not much the PBX guys can do to defend against that," Tumolillo said. If the future does not favor the BOCs, they may not find it feasible to continue serving only smaller customers.

Several advances are expected to help Centrex over the next few years. They include the availability to users of remote switching modules placed on customer premises to handle interbuilding calling and other applications, the installation of more feature-laden digital central office switches and the line cost reduction realized by fiber-optic cable from the central office to the customer site.

Copies of the study, *The Future of Centrex*, are available from Probe Research for \$2,250 each if ordered before July 15 and for \$2,750 if ordered after July 15. □

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## ► BROADBAND NETS

# System to spur MAP, Ethernet coax-istence

*Chipcom at work on new remodulator.*

**BY BOB WALLACE**  
Senior Writer

WALTHAM, Mass. — Chipcom Corp., a manufacturer of broadband local-area network components, last week announced it is developing a head-end remodulator that will enable Ethernet networks and Manufacturing Automation Protocol networks to coexist on the same broadband coaxial cable.

Although the product will not be available until September, the nation's largest automobile manufacturer, General Motors Corp., has already expressed interest in installing the device in many of its factories.

The 802.3 HE Ethermodem Remodulator, used with Chipcom's broadband Ethernet

modems, will enable users to carve out two 16 MHz channels from existing IEEE 802.4 broadband token-passing bus networks for use with Ethernet. This enables users to retain the three 6 MHz channels specified for use with MAP networks.

Maureen Lawrence, marketing vice-president for Chipcom, claimed the device can also be used to establish a backbone net to interconnect baseband Ethernets using Chipcom repeaters. This is achieved by adding the Chipcom

802.3 HE Ethermodem Remodulator to the network's head end, a device that routes traffic on the net.

It also enables devices with Ethernet interfaces to be directly attached to the broadband net using Chipcom's broadband Ethernet modems.

Lawrence claimed E.I. DuPont de Numours, Stanford University, Michigan State University and Boeing Computer Services, Inc. have already linked some of their baseband Ethernet networks to broadband nets using Chipcom's broadband Ethernet modems.

Lawrence claimed Ethernet networks offered by Digital Equipment Corp., Sun Microsystems, Inc., Micom-Interlan, Excelan, Inc. and 3Com Corp. can be linked

to broadband nets using a combination of Chipcom equipment.

She added that the equipment had been tested with an Ethernet system offered by Banyan Systems, Inc., but did not say if the Banyan and Chipcom products interoperate.

Steve Dillon, a senior staff research engineer with GM's Advanced Engineering Staff, said many of the automaker's production facilities could use the features the Chipcom product offers.

*“GM has expressed interest in installing the device.”*

Dillon, chairman of the MAP Task Force, said broadband nets have been used in many GM facilities for as long as 15 years.

Dillon said many of these nets are crowded and that the radio frequency channels recommended to support MAP nets are currently being used for other non-MAP services. “There are many services, such as video and point-to-point connections, that sit right in the middle of the MAP channels because these systems predate MAP,”

Dillon explained.

“There is a definite problem trying to allocate two [radio frequency] channels in each direction for MAP and three or four channels in each direction for broadband Ethernet networks,” Dillon asserted. “This is a very serious concern.”

Dillon said the MAP broadband technical committee is attempting to create a document that would recommend that specific frequencies be used to support MAP networks. □

## ► LINKING LANS

## Net bridge bolstered

**BY KARYL SCOTT**  
Washington, D.C. Correspondent

MOUNTAIN VIEW, Calif. — Vitalink Communications Corp. last week unveiled an updated local-area network bridge that operates at T-1 and greater speeds. The Translan III product is an enhancement of the company's existing product line introduced more than a year ago.

Translan III forms a transparent wide-area network by supporting single, parallel or multiple circuits between multiple Ethernet local-area networks. Local-area networks connected via Translan models appear as a single network to the user, even though local nets throughout the country may be connected via satellite or terrestrial links. Translan III can transmit information at speeds from 56K bit/sec to 2.048M bit/sec. Depending on configuration, the Translan II supports speeds of either 224K or 448K bit/sec.

Vitalink designed this technology in conjunction with Digital Equipment Corp. Translan operates at the data-link layer of the Inter-

national Standards Organization's (ISO) Open Systems Interconnect model.

Translan can connect a wide variety of products, ranging from personal computers to supercomputers, due to its conformance to IEEE and ISO standards, said Vitalink Vice-President of Marketing Paul Schaller. It can connect devices from various vendors, as long as the device exists on the Ethernet net. Translan III can process up to 2,400 frames of data per second at peak times and more than 1,500 steady state operations. It has four V.35 ports.

Vitalink also announced software enhancements to Translan II that allow its users to communicate with Translan III. The parallel links between Versions II and III give the user flexibility in configuring networks. If a main circuit becomes overloaded, a user can offload data onto a parallel link, and Translan will balance the traffic.

Translan III and Translan II with updated software are priced at \$15,000 each. Software licensing and maintenance cost \$750 a year. Volume discounts are available. □

## ► LOCAL NETS

## Banyan, Tallgrass join in server deal

*Companies sign \$8m contract; Banyan unveils desktop system.*

**BY JIM BROWN**  
New Products Editor

NEW YORK — Banyan Systems, Inc. last week unveiled a desktop version of its Banyan Network Server, called the Banyan/DTS, and Vines/286 software that turns an IBM Personal Computer AT into a file and communications server.

The company also announced a two-year OEM agreement valued at \$8 million with Tallgrass Technologies Corp. Under the OEM agreement, Tallgrass of Overland Park, Kan., will offer a Banyan/DTS clone called the TG-8000 and a version of Vines/286 to be marketed as TG-800-AT. Tallgrass will sell through retail distribution channels, a market Banyan has avoided to date. Tallgrass is primarily a mass storage device manufacturer.

The 30-user Banyan/DTS server,

which is based on a Motorola, Inc. M68000 microprocessor and runs under Banyan's Unix System V-based Vines network operating system, will reportedly perform the

provides protocol conversion to support communications and file sharing between three different local-area networks.

The DTS is also capable of pro-

*“The Banyan/DTS will enable up to eight personal computers to establish links through a communications gateway.”*

functions of the larger Banyan Network Server. Banyan/DTS, for example, will enable as many as eight personal computers to establish links through a communications gateway. The Banyan/DTS also

viding IBM 3270 terminal emulation capabilities for attached personal computers.

According to a Tallgrass spokesman, the TG-8000 has more expansion slots, memory and communica-

tions ports than the Banyan/DTS. Future plans are to merge Tallgrass' disk drive and tape backup subsystems into Banyan servers.

“Banyan is taking about \$22,000 of hardware and condensing it to a \$10,000 offering,” said Eric Kilgorin, president of the Andover, Mass.-based Hyatt Research Corp. “One of the big obstacles to Banyan has been the high cost of buying its product,” he added.

The Vines/286 software allows a Personal Computer AT to act as a file and communications server for between three and 15 attached personal computers.

Available in August, a base Banyan DTS with one megabyte of memory, a 43M-byte hard disk, a 60M-byte tape unit, Vines network operating software, support for one local-area network, network administration functions, system hardware diagnostics and serial communications lists for \$9,995. The basic Vines/286 software supporting one local-area network, network administration functions, local-area network diagnostics and documentation will be available in October for \$1,895. □

## ► REGULATORY DEBATE

# Broad support gives Dole's BOC control bill a fighting chance

*But users uncertain about impact of FCC rule over industry.*

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — While users last week were still assessing the potential impact of Senate Majority Leader Robert Dole's (R-Kan.) recently introduced Federal Telecommunications Act of 1986, the bill has already won broad bipartisan support here.

Members of Congress and officials of the Department of Defense, the Department of Commerce and the Department of Justice have echoed the Reagan administration's support of the legislation. The Dole bill would transfer control over the regional Bell operating companies from the Justice Depart-

ment and U.S. District Court Judge Harold H. Greene to the Federal Communications Commission.

Andrew Lipman, an attorney with the Washington law firm of Pepper, Hamilton & Scheetz, said, "The legislation has broad support from the administration and some key congressional players involved in telecommunications." He added that the measure has a good chance of getting through Congress by the end of this term.

Representatives of users groups interviewed by *Network World* said it is too early to predict the ultimate effect of the proposed legislation. They expressed uncertainty about whether the FCC or the Department of Justice would best pro-

tect their telecommunications interests. Some fear the FCC will permit the BOCs to enter into speculative businesses, setting up a situation where basic ratepayers end up subsidizing BOC losses.

John Compitello, chairman of the Public Policy Committee of the Association of Data Communication Users and vice-president of communications for Irving Trust

Co., said the FCC should be given authority over the BOCs. "I don't see how Justice has done that much to keep the BOCs out of unrelated lines of business," he said. "Why, for example, did Judge Greene let the BOCs get into the real estate business? It's totally unrelated to basic telephone service. As a result of these ventures, I think the quality of basic service has diminished."

While in favor of allowing the BOCs to get into related telecommunications and information services businesses, Compitello expressed his organization's concern that the BOCs be monitored closely to ensure that the quality of basic service is maintained.

"At times, the BOCs haven't  
See Dole page 38

## ► STANDARDS

# COS beckons to users

*International groups also embraced.*

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — Meeting here last week, the Corporation for Open Systems (COS) announced its intention to increase significantly the number of user organizations participating in the standards steering group. COS also said it will open its ranks to admit international organizations.

The group, currently comprising 12 users organizations and 43 vendor firms, hopes to provide a single, consistent set of test methods and certification procedures for accepted communications standards. COS officials last week said the group hopes to increase its total membership to 100 organizations by the end of this year. The group would like 50% of those to be users organizations.

COS' goal is to help vendors bring products to market that are compatible and can operate in a multivendor environment. COS also plans to become a clearinghouse for standards documentation by offering an on-line data base.

"Let's face it, COS needs user members because the problems being solved by vendors are user problems," said Lawrence J. Matteson, group vice-president of Eastman Kodak Co., a user member of COS. "Users are crucial in helping vendors to identify problems, set priorities and establish test criteria. After all, the test methods that COS will be creating are designed to emulate how user systems work. Users can additionally help vendors focus on the areas of greatest commercial opportunity," he said.

Bechtel Group, Inc. joined COS because the company found COS

"pushed vendors to design the solutions we needed as far as we could as an individual company," said O.R. Pardo, manager of information services at Bechtel. "We use a variety of vendors from IBM and DEC to Sperry [Corp.] and Wang [Laboratories, Inc.]. We really had to force the vendors to design software that would allow all these devices to intercommunicate.

"We could not justify custom-designing software. We pushed hard for commercial solutions and went as far as we could alone," Pardo added. "Then we joined COS to work with other users to ensure that vendors address real-life problems."

According to Dale O. Irvine, vice-president of Citicorp's Technology Office, Citicorp has always been active in international standards organizations. But in many cases, he added, integrated products were not available and the company had to grow its own solutions. Irvine said Citicorp sees COS as a starting point for the creation of products that will link islands of automation in its offices.

Members of COS' governing board opened the meeting to the press and analysts for the first time since COS was formed in March to announce its expansion into the international arena. COS President Lincoln Faurer revealed that COS would admit members from Europe and Japan as soon as it can change its organizational bylaws. COS will meet in Europe and Japan in September.

Faurer said COS has always been envisioned as an international organization that could advance the adoption of communications standards. ▀

## ► NATA WEST

# Phone systems star at lukewarm industry show

BY MARY PETROSKY

West Coast Correspondent

SAN FRANCISCO — Electronic key telephone systems and private branch exchange systems — many aimed at the low end of the market — dominated the Nata West show here last week. Although the show's sponsor, the North American Telecommunications Association (Nata), expected to draw a crowd of 8,000, preregistration at the show's opening stood at 2,000, including the 100 exhibitors. Nata expected walk-in traffic during the show's three-day run to boost the preregistration figure to 4,000.

Nata West is the association's first crack at a regional show, according to Alan Shark, Nata's director of marketing. He said Nata is trying to reposition the show to appeal to users, directing eight out of 14 seminars — including one on basic data communications — at users.

Two seminars gave special attention to small businesses, which are perceived as a large, untapped market. Nata shows previously focused on telecommunications manufacturers and suppliers.

Asked to comment on regulatory matters, manufacturers were reluctant to go on record; however, they were privately critical of proposed legislation to transfer regulatory control of the regional Bell operating companies from the Department of Justice to the Federal Communications Commission. Many were skeptical about the FCC's ability to prevent the RBOCs from subsidizing their unregulated businesses with money from regulated businesses.

The RBOCs have already spent nearly \$950 million of ratepayers' money to cross-subsidize competitive endeavors, according to Nata President Ed Spievack. This charge is based on Nata's analysis of documents, including 10K financial statements, that were submitted to the FCC, Spievack told *Network World*.

"The issues of cross-subsidization and vertical integration are what [the proposed legislation] is about," Spievack said. "Through sheer political lobbying, the RBOCs are on the verge of overturning [the consent decree] before monopoly control has been lessened." Although the Reagan administration gives lip service to the notion that a monopoly should not subsidize competitive operations, in practice, it is biased in favor of the RBOCs, Spievack added.

Several manufacturers used the show to introduce new or enhanced products. C. Itoh Electronics, Inc., known in the computer industry for its printers and terminals, made its debut in the telephone interconnect market with a system called Escom. Aimed at executives and secretaries, Escom integrates a key telephone system, messaging system and capabilities akin to a personal computer.

Developed in conjunction with Sharp Corp., Escom consists of a control unit with central processor, network and data base supported by a 3½-inch floppy disk drive. The system, which can connect to any existing PBX or Centrex system, supports up to 16 voice/data stations.

The control unit contains a 1,200 bit/sec modem, and a serial printer can be connected to it and shared by all stations. Each of the three telephone stations features a liquid crystal display, which can list messages, prompts or information brought in from an outside data base or downloaded from internal computers.

Toshiba Telecommunication Systems Division of Tustin, Calif., added four new electronic key systems with internal power supplies and smaller housing, in addition to expanding the station features of its Strata series.

Iwatsu America of Carlstadt, N.J., introduced a mid-range version of its Omega-Phone IV. The EX-1232/2464 can provide up to 24 lines and 64 extensions. ▀

## ► VSATS

# Equatorial retreats

*Slow sales necessitate production cuts.***BY BOB WALLACE**

Senior Writer

MOUNTAIN VIEW, Calif. — Owning to sluggish sales of its very small aperture terminal equipment and services, Equatorial Communications Co. recently said its manufacturing operations here will shift to a four-day work week beginning July 11. The company also announced it had laid off 36 of its 700 employees.

Osa Mok, assistant treasurer for Equatorial, claimed the belt-tightening measures will save the company roughly \$3 million to \$4 million this year. The actions, he said, were necessitated by the lengthy and unanticipated lead time involved in selling two-way Vsat network services to communications users.

Mok attributed the sales delays to user confusion about telecommunications network alternatives. "There have not been as many orders for two-way Vsat networks as we originally expected," he explained.

The announcement comes after several major vendors announced Vsat-based services. GTE Spacenet Corp. announced its Skystar Data

Network service at the recent International Communications Association meeting. AT&T Communications, Inc. began offering its two-way Skynet Star Network Service on May 20. Equatorial, GTE Spacenet and several other satellite service vendors initially attempted to block the AT&T Vsat offering, claiming it was priced to drive competitors out of the Vsat marketplace ("FCC delays Skynet again," *Network World*, May 5).

Joaquin Gonzalez, director of the strategies in telecommunications program at Stamford, Conn.-based Gartner Group, Inc., said a number of forces precipitated Equatorial's recent actions. "The problem communications managers are faced with is that they must explain to upper management why they plan to turn over a critical data communications application to a little company in California," he explained. The entrance of AT&T and other communications giants into the Vsat network market has also made life difficult for smaller firms like Equatorial, he added.

Gonzalez said Equatorial's stature in the Vsat network market has not been helped by its use of the C-band for its satellite service offer-

ing. "Equatorial may very well offer a better networking solution, but communications users think Ku-band services are better or are more technologically advanced," Gonzalez hypothesized. "I have had customers tell me they had already decided to [do business] only with vendors that offer Ku-band services."

Farmers Insurance Group, the first user of Equatorial's packet-switched, two-way Vsat network service, signed a \$30 million contract with the vendor to provide a

3,000-site system ("First user eyes \$2 million savings," *Network World*, March 31). Dennis Shanley, director of systems research for Farmers Insurance Group, said the company is not concerned about Equatorial's cost-cutting moves — provided Equatorial continues to meet Farmers Insurance Group's Vsat delivery schedule. Equatorial is currently installing 50 Vsats per week for the Farmers Insurance Group network. "I don't think we will be affected by Equatorial's actions," Shanley said. □

## ► REGULATIONS

## RBOC to manufacture

**BY BRUCE HOARD**

Editor

WASHINGTON, D.C. — In what may be one of his final decisions affecting the future of the regional Bell operating companies, U.S. District Court Judge Harold Greene last week granted Ameritech a waiver allowing it to manufacture communications equipment abroad.

This marks the first time the Department of Justice, which currently oversees RBOC activities under the terms of the Modified Final Judgment, has granted an RBOC permission to manufacture both at home and abroad. In the wake of the decision, it is expected that the other six RBOCs could, if they ask for it, also be granted permission for foreign manufacturing. Ameritech first filed for the waiver on Aug. 1, 1985, and the Justice Department recommended that Greene approve it on May 28 of this year. That set the stage for last week's decision.

An Ameritech spokesman said the company, which has previously been granted waivers to do con-

sulting projects overseas, was frustrated in its efforts to bid on other projects because it lacked a manufacturing presence. "We found ourselves at a competitive disadvantage," the spokesman commented.

He went on to say that, rather than establishing a manufacturing entity of its own, Ameritech will most likely take advantage of one that already exists. "We will seek to team up with another company or make an equity investment in a foreign manufacturer," he stated.

This could be one of Greene's final decisions governing the RBOCs because of Senate Majority Leader Robert Dole's (R-Kan.) proposed Federal Telecommunications Act of 1986. Currently being considered in the U.S. Senate, the proposed act would transfer all control of the RBOCs from the Justice Department and Greene to the Federal Communications Commission (see "Broad support gives Dole's BOC control bill a fighting chance," page 6). The bill currently has the backing of a powerful coalition here. □

**Alaska from page 2**

costs. The state is so dependent on telecommunications that it can only cut so far before it starts cutting its own throat."

The state made the decision to terminate the second transponder lease in May after studying cost-comparing options for roughly four months. Hickman said the future of the network is uncertain because the state is heavily dependent upon oil revenues. "Even though oil prices have risen over the past two months, we won't feel those results for 12 to 18 months," he added.

The instructional programming portion of the network's offerings will be hit hardest by the cost cuts. Once offered 24 hours a day, seven days a week, this service will now have to share the remaining satellite transponder with live video teleconferencing services. Hickman said he had not yet determined how many hours a day the instructional television programs would be available to the state's population.

The Learn Alaska Network cost roughly \$30 million to assemble, Hickman said. The audio and data portions of the network became operational in 1980. The video portion of the system came on-line in 1982. The network provides both one- and two-way video services and consists of a dial-up, 200-line, two-wire, audio network. Equipment used at the 250 network locations includes personal computers, Teletex and Videotex terminals.

Although the availability of services offered over the Learn Alaska Network will be limited, the use of

the video teleconferencing is expected to increase markedly. Hickman said many state agency budgets have been reduced and many officials have expressed interest in substituting videoconferences for travel as a means of cutting operating costs.

The state's population, including students in Alaska's kindergarten through Grade 12 public school system, will likely be denied valuable educational programming. The Learn Alaska Network had provided 60% to 90% of the state's public schools with various types of programming. Roughly 3,000 people had enrolled in college-equivalent courses offered over the net last year alone, Hickman noted.

Hickman said his department is formulating plans aimed at lessening the blow dealt the state's education system by the consolidation of the Learn Alaska Network. "We may be able to broadcast the supplemental programming at, say, two a.m. The shows could be tape recorded and played back in classes the next day," he said.

In contrast to the Learn Alaska Network, the state's Legislative Telecommunications Network (LTN) has not been adversely affected by the state's cost-cutting moves. Sue Gullufson, manager of the public services division that operates LTN, explained that the operating costs of LTN were trimmed in 1985 but were not reduced again this year. The 72-site audio teleconferencing network is used by state legislators to communicate with their constituents. □

**Impact from page 2**

Grove Village, Ill.-based manufacturer of automated equipment and systems, was one of the AMS attendees who toured the Impact minifactory. Although his \$1 million company produced parts for equipment used in the CIM demonstration, Walter claimed he cannot afford to use automated factory equipment in his own factory.

"The equipment is just too costly. CIM is a method of the future," he said. Walter added that his company's single manufacturing facility does not employ robot technology or any advanced manufacturing systems. Water is considering implementing a computer-aided design and manufacturing (CAD/CAM) system in the future.

Bernard Barc, president of A. Barr Sales Co., a Lyons, Ill.-based processor and packager of soft drinks, also said a CIM solution is not in his company's immediate future. "We won't adopt CIM in my lifetime or in my children's lifetime," Barc asserted. The \$5-million company, which has a second factory in Grand Prairie, Texas, will

probably apply factory automation sporadically in the future, Barc forecasted.

Friedrich Air Conditioning & Refrigeration Co., a \$70-million company, has two factories in San Antonio, Texas and one in Fort Worth, Texas. Robert Paikowski, manufacturing director for the company's room air-conditioning division, said the company is currently struggling to get a handle on manufacturing costs.

"We have to control costs first and then search for answers to automation problems," he maintained.

Friedrich is currently installing factory automation equipment in its plants. In one application, robots have already replaced human workers, Paikowski said. Robots bend copper tubing used for refrigeration coils, a job once performed by company workers, he added.

Robots perform the task in about one-fourth the time required by humans. "The use of robots has increased output and has also improved the consistency of the parts," Paikowski claimed. □

**Pipeline from page 1**

oversees a 25-member telecommunications management team that controls Arkla's more than 350-drop network.

The network provides communications between the company's hundreds of facilities, monitors the flow and pressure of gas in Arkla's pipeline and supports electronic billing between Arkla and its wholesale and retail customers. The company's network costs average \$250,000 per month.

One important money saving measure instituted by Bray and his colleagues has been a close auditing of the company's telephone bills to ensure Arkla actually has all of the circuits and equipment for which it is being charged.



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"We've probably saved \$500,000 by eliminating circuits and equipment that we didn't need," Bray said.

According to Bray, unnecessary equipment and circuits were uncovered and identified by "looking at our bills and, in a lot of cases, saying 'go out and see if that stuff is really there.'"

In order to decipher Arkla's phone bills, Bray consults AT&T and other telephone company billing code books. "We try to keep a good library of things like the facility interface code book and the universal service order code book. The books list all of those strange little numbers that you see on your phone bill," Bray said.

"There are always cases where you can't find what a number means. You have to call the company and say 'What in the heck does this mean?' Sometimes they can't tell you. That's when you say, 'Get it off my bill.'"

Bray also cut down on costs by reconfiguring the network and routing circuits more efficiently, using personal computer-based network modeling software from Connections Telecommunications, Inc. of Bridgewater, Mass.

"You have to play games with your network," Bray advised. "You have to sit down and say, 'If I do this, how is it going to work? How is it going to affect the cost and the operation?' You can't do that once a year. You have to do it often."

According to Bray, Arkla hopes to realize more savings in the future by keeping as many lines as possible within state and local access and transport area boundaries. This will allow Arkla to take advantage of lower intrastate and intra-Lata private line services.

Prior to 1984, Bray said, Arkla had little control over its telecommunications services.

"There were hundreds of people calling the telephone company and adding service. When lines were no longer needed, they were not disconnected. Until all of that responsibility was brought under one department, there was no follow-up."

Now the company's telecommunications department keeps the network under tight control and continues to search for new ways of saving money and improving network performance. "We want to get better performance and chip away at that \$250,000 a month network bill," Bray said. □

**Bridges and gateways from page 2**

communications research programs for International Data Corp., a Framingham, Mass.-based market research company, warned users that the gateway market is rife with vendor promises of product capabilities. He said products are often unable to perform as well in a user's network as in a vendor test site. "Vendors can control the flow of data and frequency of response in a test site," he said.

Moreover, Myhre added, some gateway products provide one-way communication only.

Whether users select bridges or gateways, they should make sure

**BY KARYL SCOTT**

Washington, D.C. Correspondent

# Washington update

■ The nearly month-long Communications Workers of America (CWA) strike against AT&T ended last week after negotiators reached tentative agreement on issues affecting six company units. Union officials told some 155,000 CWA members to be back on the job beginning 12:01 a.m. Friday. Negotiators at five of the units had reached agreement by Wednesday, and the remaining unit, AT&T Information Systems, reached an accord the following day. CWA and AT&T reached a tentative contract settlement last week that must be ratified by Aug. 4. Both sides said the agreement was a good one.

■ The U.S. House of Representatives last week approved the Communications Privacy Bill of 1986, which extends protection under the existing wiretap law to other forms of electronic information transfer, such as computer communications and cellular telephone and satellite transmissions.

The bill, which is designed to bring the 1968 wiretap law into line with current communications technology, protects electronic communications from unlawful search and seizure and establishes strict procedures that law enforcement officials must follow to gain access to electronic communications during an investigation.

The proposal was supported by the Reagan administration, the Electronic Mail Association, civil libertarians and companies operating cellular telephone systems. It now goes on to the Senate, where quick approval is expected. The legislation could be signed into law by early this fall, according to those close to the issue.

■ After studying the business plan presented by the National Telecommunications Network (NTN), the U.S. Department of Justice recently concluded it would not challenge the organization on antitrust grounds.

NTN is a joint venture of sev-

en regional fiber-optic carriers that plan to interconnect their nets to form a nationwide fiber-optic communications network. Douglas Ginsburg, assistant attorney general for antitrust matters, said the plan has the potential to enhance competition and may offer an alternative to existing transmission systems.

NTN had asked Justice to review NTN's business plan to ensure it was not in conflict with antitrust laws.

The partners have raised an estimated \$700 million. When completed, the network will form a fiber-optic ring around the eastern U.S., with main routes in Washington, D.C., Chicago, Dallas and Miami. The venture will provide service to 158 cities.

■ GTE Corp. and United Telecommunications, Inc. recently signed a definitive agreement to form US Sprint Communications Co. If the deal is consummated, the new company will comprise the two firms' long-distance telephone companies and specialized data communications service companies.

The Federal Communications Commission granted the firms' request to transfer control of their various licenses, permits and communications facilities to the new company. According to an FCC spokesman, "The record clearly demonstrates that GTE and United [Telecommunications] have more than sufficient resources to underwrite the approximately \$1.6 billion . . . partnership."

■ Pacific Bell has asked the FCC for permission to provide protocol conversion service in conjunction with its Project Victoria service on a one-year trial basis. Project Victoria is a digital transmission service using a voice/data multiplexing technique over twisted-pair wire. The technology divides the wire into five data channels and two voice channels capable of transmitting low- and medium-speed digital data and analog voice and data. The trial is expected to begin Nov. 1 in Los Angeles and San Francisco.

their choice is compatible with whatever network management system they employ. Robert Newton, local-area communications director at the Gartner Group, a Stamford, Conn.-based consulting firm, said network management tools should not be affected by protocol-independent bridges.

"Gateway traffic should be able to respond to a network management program on whatever side the gateway traffic runs," Newton said.

According to Red Crossman, IBM interconnect marketing manager for Digital Equipment Corp., a user may be able to buy a repeater —

which strengthens a transmission signal by regenerating it — in lieu of a bridge, if the need is simply to eke more nodes out of an Ethernet. A repeater may typically cost \$1,500. The user would also need a \$300 transceiver to connect additional nodes to the local network.

A simple protocol-independent bridge used for baseband or broadband local-area networks costs between \$8,000 and \$12,000. The price of gateway products varies widely — ranging between \$10,000 and \$25,000 — also depending on the type of network.

Next week: Other options for linking local networks. □

# INDUSTRY UPDATE

“Dangers to competition and ratepayer pocketbooks should dictate a cautious approach to modifying the AT&T divestiture agreement. The proposed legislation, however, would place Modified Final Judgment review in the hands of the Federal Communications Commission, an agency that has been criticized by congressional committees for precipitous action and insensitivity to the interests of local ratepayers. The legislation would nullify lawful judicial and antitrust processes, encourage higher local telephone rates, complicate the task of utility regulators and jeopardize the competitive environment for equipment, long-distance and information services.

Response of 10 trade and consumer organizations to Sen. Robert Dole's (R-Kan.) proposed legislation

## ► SATELLITE SERVICES

# Portable earth station winning corporate fans

*Emerging as alternative to traditional phone service.*

BY KARYL SCOTT

Washington, D.C. Correspondent

FAIRFAX, Va. — A suitcase-sized portable satellite earth station is quickly gaining acceptance among corporate users that need to be able to establish communications channels to areas where traditional telephone service is poor or inaccessible.

The Transportable Communications System 9000 (TCS 9000), developed by Comsat Telesystems, Inc., based here, is a land-based application of a technology originally developed for maritime use.

The 35-inch dish antenna and attendant electronics weigh 108 pounds and break down into two suitcases that can be carried on board a plane. The earth station requires a 385-watt energy source and can be run with batteries or a portable generator.

Voice, telex, facsimile and a vari-

ety of other types of data can be transmitted full duplex at 9.6K bit/sec. The system uses the L-band of the radio spectrum, which is allocated to the International Maritime Satellite Organization (Inmarsat), a consortium comprising 45 member nations.

Oil companies, news gathering operations, police and intelligence organizations and multinational corporations are using the antenna in places with unreliable communications systems.

Banks with branches in South America and the Middle East are also purchasing these small terminals because the telephone systems in some of these regions do not provide required availability. Other firms are buying the transportable earth stations as part of their emergency backup communications systems.

While ideal for these applications, some users have encountered

problems bringing the TCS into foreign countries. Some Postal Telephone and Telegraphs have prohibited temporary use of the earth stations because they do not want to lose international telephone call business, according to Edward J. Bender, director of marketing for mobile satellite systems at Comsat. Comsat is working with its end users to overcome foreign restrictions.

The antenna comes in four pieces that can be assembled with a wrench. The console contains the system electronics, which allows a telephone, facsimile, teleprinter or portable computer to be attached.

Assembly takes about 20 minutes, and the most complicated stage is orienting the antenna at one of the three geosynchronous Inmarsat satellites. Using a compass that comes with the earth station, the user can find his longitude

See **Comsat** page 12

## ► TELECOM INDUSTRY

# Japan set to deal with U.S. firms

BY NADINE WANDZILAK

Staff Writer

STAMFORD, Conn. — Despite Japan's impressive volume of telecommunications equipment exports, significant sales opportunities exist in that country for U.S. hardware and software suppliers, according to a study published this month by Business Communications Co., Inc. (BCC).

Japan's trade surplus in telecommunications equipment grew to almost \$1.3 billion in 1984, the study states. Just over half of Japan's total exports of telecommunications equipment in 1984 went to the U.S. On the import side, Japan took in some \$148 million worth of telecommunications equipment in 1984. More than 80% of the imports came from the U.S.

The Japanese telecommunications market is the second largest in the world, according to BCC, which predicts that Japan's imports of telecommunications equipment will grow at an average annual rate of 19% through 1988. Overall, the BCC anticipates that the Japanese telecommunications market will be valued at \$9 billion to \$10 billion by December 1988.

Sales of central office and packet switches, satellite communications equipment and wireless communications devices such as car telephones and personal pagers offer particularly good sales opportunities for foreign manufacturers, the report states.

BCC also projects noteworthy growth in sales of standard and multifunction telephone equipment and facsimile. In network equipment, BCC anticipates growth in network and digital switching equipment and large capacity optical transmission systems.

The Japanese market was opened to foreign companies only 14 months ago. Non-Japanese firms had been shut out of the Japanese telecommunications market because Nippon Telegraph & Telephone (NTT) would not consider them as suppliers. But as of April 1, 1985, NTT lost its monopoly and Japan's telecommunications market became more competitive. Since then, 77 types of U.S. hardware have been certified for sale in Japan, according to the BCC report. The U.S. has a competitive advantage.

See **Japan** page 12

## VENDOR VIEW

EUGENE LOTCHINSKI

# C III clearing a path to the future

As change continues in the telecommunications industry, it is important to recognize and understand its implications for the communications user. This is particularly necessary with regulatory change because the jargon and complexity of policy-making are often confusing and difficult to interpret.

On May 15, the Federal Communications Commission approved the Third Computer Inquiry, eliminating requirements that compel AT&T and the Bell operating companies to offer enhanced services through subsidiaries structurally separate from those through which regulated basic services are provided. While telecommunications suppliers, regulators and others continue to discuss and debate the

FCC's action, benefits to communications users appear certain for today and tomorrow.

Prior to the FCC's Computer III decision, AT&T and the BOCs were required to establish arm's-length subsidiaries to offer new services to residential and business users. Local telephone companies, however, were often hesitant to offer these services because of the costs associated with the separate subsidiary requirement. As a result, many new communications services were unavailable to users served by the public network.

The Computer III decision will replace these structural rules with alternative, nonstructural safeguards. These include strict cost accounting by the telephone companies, as well as network disclosure requirements, rules against the misuse of customer proprietary network information and open network architecture

requirements. Until the FCC approves these alternative plans in the next few years, AT&T and the BOCs can provide enhanced services on an unseparated basis in accordance with interim provisions. This includes the offering of comparably efficient interconnection (CEI). The interim CEI provisions require AT&T and the BOCs to grant competing service providers equivalent access to the nation's basic public network highways.

Though the full impact of the FCC's action may not be felt for several years, the Computer III decision has been heralded by many as a first step in opening up competition in the information services market. Supporters of the FCC's action recognize that in doing so, it offers benefits to communications users today and a clearer path to future advantages.

See **Computer III** page 12

Lotchinski is vice-president of market development at Northern Telecom, Inc. in Nashville.

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**Comsat from page 9**

and latitude, feed those coordinates to the earth station, which will in turn tell the operator where to point the earth station.

The antenna can be left outdoors and the console brought indoors. The antenna can also be set up indoors to transmit through a window. Data can be sent and retrieved unattended.

Comsat also plans to market the Vehicular Communications System (VCS) 9100, which is a satellite communications system mounted on a four-wheel drive vehicle.

The TCS 9600 and VCS 9100 afford the user "transmission on demand," Bender said. "The user doesn't have to prearrange transponder space for a particular time.

All he has to do is register the equipment with Inmarsat, which assigns the user an identification code."

To begin transmission, the user sends a brief message that contains his identification number. The number is sent to the satellite, which relays it to the nearest coastal Inmarsat earth station — the maritime equivalent of master earth station — for confirmation. Once the coastal station accepts the code, it relays acceptance back to the TCS and allows it to transmit.

Because the TCS is a private communications system, the user has built-in security, Bender said. For greater security, however, the TCS can accommodate added encryption devices. □

**Japan from page 9**

tage in at least some parts of this business, the report added.

For example, U.S. telephone equipment makers sold about \$190 million worth of equipment in Japan in 1985.

The report states that the top 10 telecommunications equipment manufacturers in Japan are responsible for 83% of telecommunications equipment production. NEC Corp. has the largest market share at 40%.

The BCC report, entitled *G-099: The Telecommunications Industry in Japan*, is priced at \$1,950 and is available from Business Communications Co., Inc., 9 Viaduct Road, Stamford, Conn. 06907 (203) 325-2208. □

**Computer III from page 9**

The elimination of structural separation provides users with a single interface to the telephone company. It therefore represents movement toward one-stop shopping for communications equipment and services. A single salesperson for the telephone company can now approach the user, offering a broad range of network-based services and customer premises equipment.

This single interface allows for a systems view of the user's communications needs. It provides a more logical integration of software services and hardware, as well as a greater opportunity for long-range planning to protect current investment. It also permits designing the user's communications system to take advantage of new services available through the public network as standards such as the Integrated Services Digital Network are fully implemented.

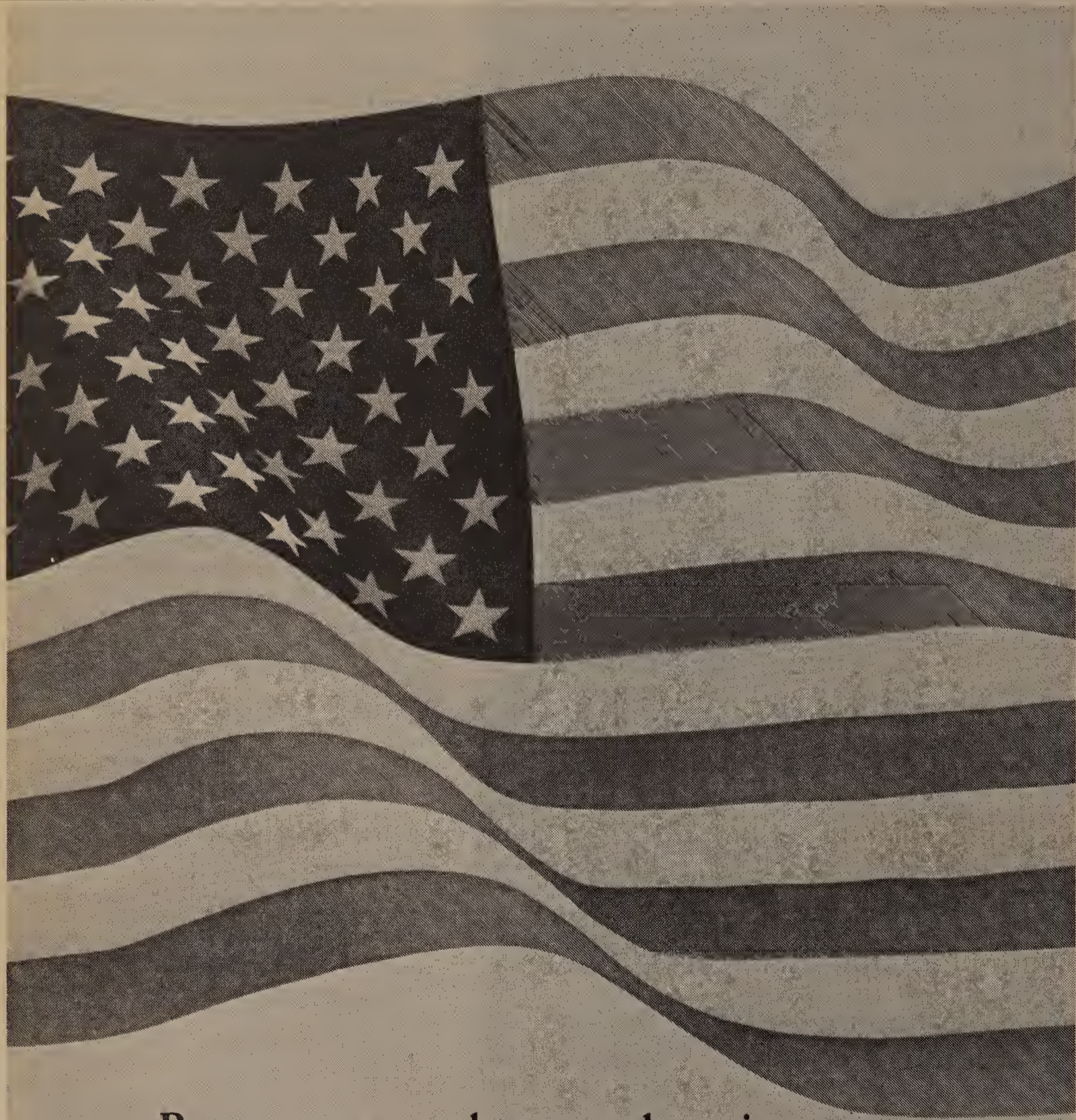
The end of structural separation also means better network management by users that lack the resources, technical knowledge or desire to purchase their own switching system. This is often true for small businesses and residences, but it also applies to large businesses, which do not have the in-house technical expertise to exploit fully the capabilities of a privately owned switch. With a single interface to the telephone company, these users have access to a variety of services and equipment, which together constitute a truly integrated system that is easier to manage. The telephone company becomes, in effect, a single, full-service vendor that users can rely on for network maintenance and problem solving beyond their level of technical expertise.

**New services will be spawned**

Future implications of the Computer III decisions are even greater, according to FCC Chairman Mark S. Fowler. "The decisions anticipate further change and encourage carriers to become even more innovative," he said. "Breaking down the wall of structural separation should make new uses of the telephone network more widely available at costs affordable to the common man."

Among these new services, Fowler includes messaging, data channels from home to school or office, fire and burglar alarm services and health monitoring. In many cases today, introducing new services to users is most efficient through the BOCs.

Although other constraints still inhibit the full impact of Computer III, the FCC's action is a step in the right direction — providing end users the ability to communicate efficiently and effectively by using all the tools available to them. It will help to alleviate some of the regulatory uncertainty that deters competition and, in turn, innovation. Ultimately, it will help to enhance the development of new information services, while it increases their availability through the public network to a wider audience of communications users. □



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# FACTORY COMMUNICATIONS

## ▶ MANUFACTURING AUTOMATION

# Haworth MAP project in gear

1st of 4 planned MAP nets installed.

BY BOB WALLACE  
Senior Writer

HOLLAND, Mich. — Haworth, Inc. has installed a Manufacturing Automation Protocol-compatible network as part of a corporatewide project targeted at streamlining the company's manufacturing cycle by reducing product inventory.

This office furnishings manufacturer has already installed a MAP-compatible network in one of two factories here and plans to have similar networks installed in its three other domestic manufacturing plants by June 1987 (see chart at right).

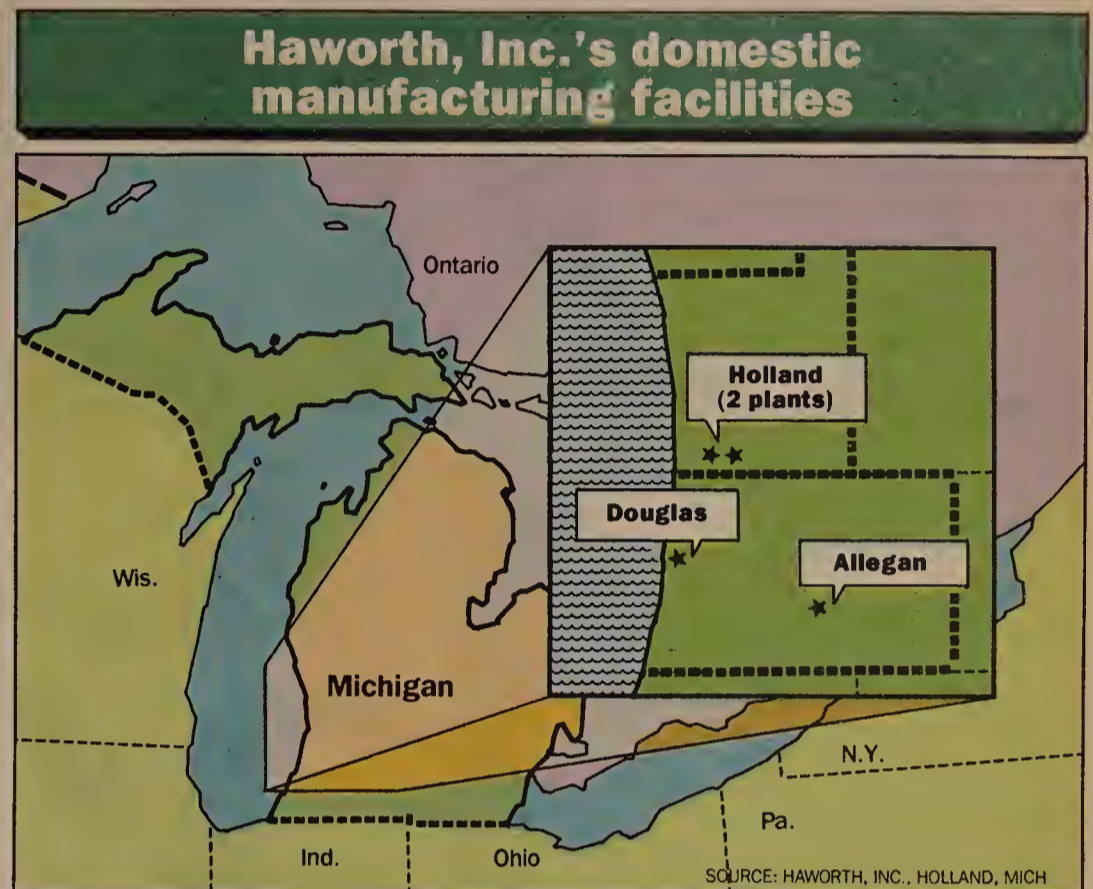
The companywide project is designed to apply the Just-in-Time (JIT) manufacturing concept to day-to-day production operations of Haworth's factories. The JIT

method requires manufacturers to have as small as possible an inventory of raw materials. This practice allows companies like Haworth to reduce manufacturing costs while also drastically shortening the amount of time required to produce a specific product.

Michael Kula, corporate engineering director for Haworth, said the goal of the four-factory project is to wed the JIT concept to the company's manufacturing facilities. Putting the JIT principles to practical use will help Haworth in a number of ways.

"The longer a product stays in inventory, the more likely it is to get damaged," Kula explained.

JIT will also help the company more easily control the quality of its products by tying their manufacture to specific orders. "If we



make 500 of a certain product and we make them wrong, we have 500 bad products on our hands."

The company commenced its latest factory networking plan by purchasing a broadband, coaxial cable-based local-area network from Concord Data Systems, Inc. More than 100 factory floor devices are connected to the MAP-compatible

Token/Net, which operates at 5M bit/sec.

The company would not divulge specific information about the networking hierarchy in the 280,000-square foot Holland plant with the Concord Data system. According to Concord Data, at least 20 Digital Equipment Corp. Micro-See **Haworth** page 16

## INCIDENTALS

United States Data Corp. has inked a pact with Novell, Inc. that will allow it to market Novell's products for industrial automation applications as a value-added reseller. U.S. Data is a supplier of microcomputer software and systems for factory automation. Novell is a supplier of local-area network products for such personal computer nets as Ethernet, Proteon Inc.'s Pronet, Corvus Systems, Inc.'s Omninet, and IBM's PC Network.



Apollo Computer, Inc. recently announced the Domain Performance Analysis Kit, dubbed Domain/Pak, an advanced set of computer-aided software engineering tools designed to help software developers learn how best to enhance the execution speeds of their programs. Domain/Pak runs on all Apollo operating systems, including Domain/IX, the company's version of the Berkeley 4.2 and Unix System V versions of AT&T's Unix operating system. Domain/Pak is priced at \$250 per node and \$980 per site and is available immediately.

For more information on the performance analysis kit, contact Apollo at (617) 256-6600, extension 4416.

## FACTORY FACTS BOB WALLACE

# Gap splits CIM theory and CIM reality

**J**ust what exactly is computer-integrated manufacturing (CIM)?

CIM has quickly become one of the most bandied-about terms in both manufacturing and communications circles. *Fortune*, *Business Week*, *Forbes* and a long list of other trade publications have either devoted entire sections to CIM or have conducted in-depth interviews with those striving to implement so-called CIM solutions in their factories.

Although CIM is difficult to explain in layman's terms, interest in the manufacturing approach is too large to measure. The Society of Manufacturing Engineers (SME) claimed that the first 1,000 copies of its newest book, *Management Guide For CIM*, were sold before they came off the press.

Despite this intense focus on CIM, few articles on the topic clearly explain what is probably best referred to as a concept or manufacturing operations model.

Patrick Gawlowski, a manager with Price Waterhouse, Inc.'s management consulting firm, said the "C" in CIM is responsible for much of the confusion about what CIM is really all about.

"It's a mistake or a misnomer for people to think of this concept in terms of computers," he asserted. "The appropriate term for it is integrated manufacturing."

Gawlowski said all departments would be interconnected in an integrated manufacturing facility. "These departments work together to produce the best possible product in the shortest possible time," he added.

Within an integrated manufacturing facility, the factory, offices, engineering, design, production scheduling and inventory departments would be able to communicate with one another, Gawlowski explained.

"One thing I have observed consistently since the term be-

gan bouncing around is that the term and CIM philosophy are way ahead of any actual practical implementation," Gawlowski noted.

## Five parts talk

Based on Gawlowski's comments as well as the actions of several of the nation's largest manufacturing companies, it is safe to say that CIM is five parts talk and theory to perhaps one part reality.

CIM is the talk of conferences, seminars, books and other publications. Groups such as SME are attempting to bring to market literature that clearly explains the CIM concept. The SME book was written by Nathan Chiantella, an industrial sector consultant with IBM and a SME vice-president.

Those interested in purchasing the 97-page book should contact SME at (313) 271-1500, ext. 418 or 419. The book costs \$12.50 for SME members and \$14 for nonmembers.

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► **HARDWARE****HP rolls out workstation***Software ties technical and PC tools.*

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a new technical workstation aimed at the software development and mechanical engineering markets. The firm also released a plug-in coprocessor card that allows its HP 9000 Series 300 technical workstation to double as an IBM Personal Computer AT clone.

The new HP 9000 Series 500 Model 560 is being placed at the top of the Series 500 line and will sup-

port from six to 32 terminal-based software development users. For use in mechanical engineering design, the Model 560 can be combined with the HP 98700H display station to support applications as a multiseat engineering workstation.

The Model 560 features three CPUs running under the HP-UX operating system, HP's AT&T Unix System V-compatible software. It has 8M bytes of random-access memory, a single I/O processor, a

six-channel multiplexer that supports modems, includes a 16-user HP-UX software license and has Fortran, C, Pascal and graphics software libraries.

HP said current Model 550 users can add-on CPU boards to become compatible with the Model 560. The add-on CPU boards are priced at \$4,500 each. The Model 560 itself is priced at \$44,950.

The firm also announced the HP Series 300 DOS coprocessor interface card, which allows the Series 300 workstation to emulate MS-DOS functions and double as a personal computer.

With the package, technical users can switch from technical to personal computer applications such as word processing, presenta-

tion graphics, data base management and spreadsheet analysis.

The card contains an Intel Corp. 80286 processor with room for installation of an Intel 80287 numeric processor, which performs arithmetic, logarithmic and trigonometric functions.

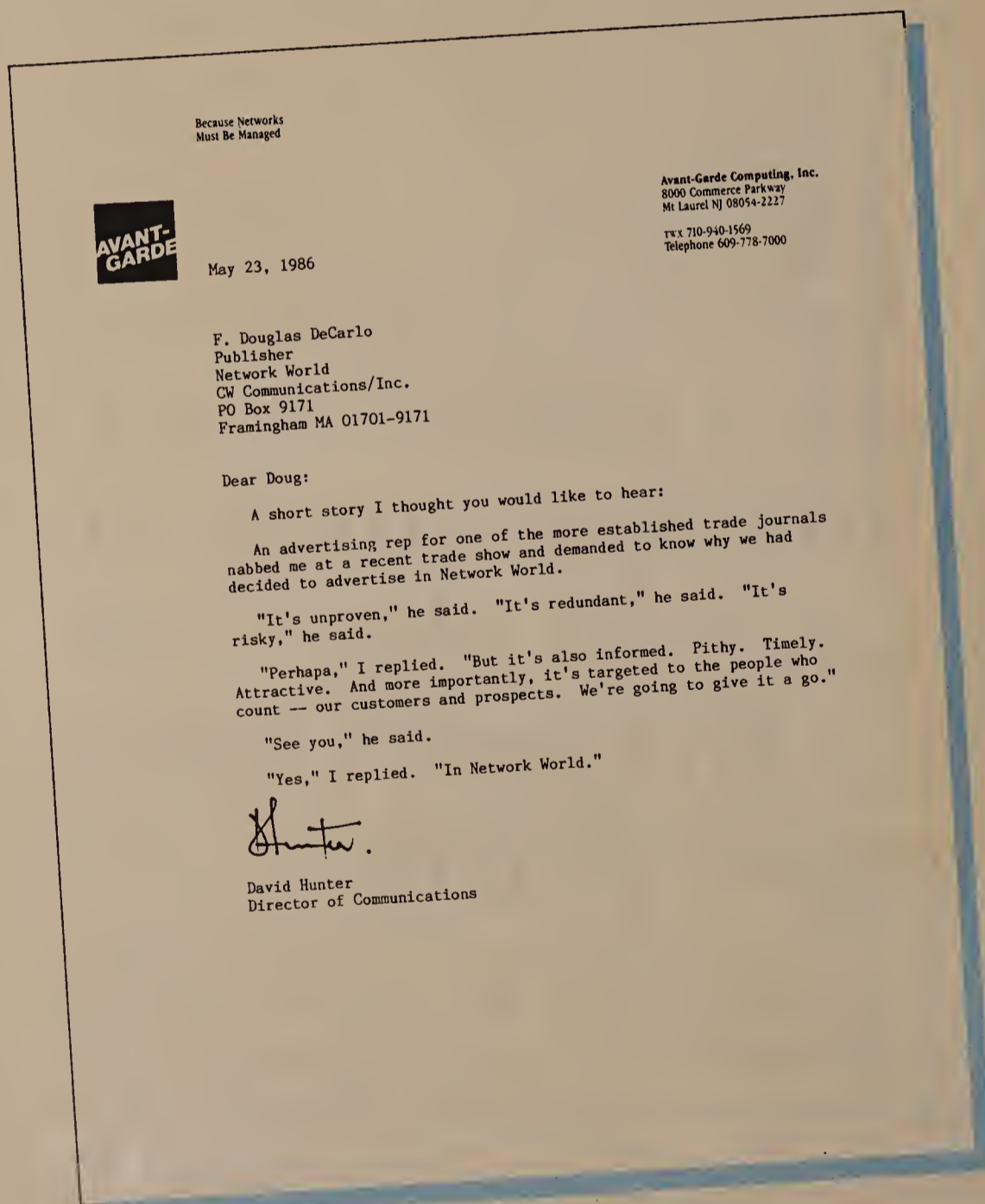
With the card, Series 300 workstations can integrate MS-DOS functions with HP-UX functions such as networking, multitasking, windowing and file sharing between HP-UX and MS-DOS.

A package containing the emulation card and associated software is listed for \$1,295. The emulation card alone is \$950, while the emulation software alone costs \$495. The additional Intel 80287 numeric coprocessor lists for \$375. ■

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**Haworth from page 13**

VAXs, one Allen-Bradley Co. Data Highway, two DEC VAXs and an assortment of cell controllers, numerical controllers, terminals and printers are hooked to the factory net. Various personal computers are also linked to the Allen-Bradley local net, Kula noted.

Kula claimed the Concord Data net, which serves as the backbone network in the plant, was installed in January of this year and has been operational since May. Concord Data claims the Token/Net can be upgraded to support an aggregate data speed of 10M bit/sec. Kula said both Concord Data staff and members of Haworth's engineering staff installed the Token/Net.

Kula and company are now sifting through responses to requests for proposals for backbone nets to be installed in Haworth's Douglas, Mich., and Allegan, Mich.-based plants and in the company's second Holland, Mich.-based facility.

Approval to begin the multiplant factory networking project came from the company's executive committee and from Haworth's chairman of the board. Kula said the manner in which the project was presented to these individuals was the key to the effort's success. "You have to explain, in monetary terms, the savings that will be realized as the result of the project," Kula explained. "One language that everybody understands is money."

The company has strived to implement the latest in manufacturing technology on its factories' floors. Kula said the company uses industrial robots in both materials handling and welding applications. Haworth also uses vision systems and bar code reader equipment to identify individual product components.

Although the company is laboring to improve the communications capabilities of its factory networks, Kula said Haworth's four manufacturing plants are not currently connected by any communications systems. "We are currently investigating different methods of connecting the plants together," he explained. If the plants are to be connected, Haworth's Engineering and MIS departments would collaborate to select the appropriate communications systems. ■





# DATA DELIVERY

## ► IMAGE PROCESSING

# IBM carving niche in emerging mart

*Two new scanners and software unwrapped.*

BY NADINE WANDZILAK  
Staff Writer

RYE BROOK, N.Y. — Image processing is evolving to overcome shortcomings typically associated with electronic mail and facsimile services.

IBM is poised to enter this market. Earlier this month, the company announced two new image scanners and a software package. The products enable a user to scan hard copy and transform a scanned image into digital input. The scanned documents can be displayed on IBM's 3193 workstations as well as the company's Personal Computer line.

With electronic mail, a user is able to send a document in real time rather than being forced to wait for the U.S. Postal Service, overnight mail couriers or even inter-office mail service to deliver the goods.

Even though electronic mail use has grown rapidly, the service does have limitations. One principal drawback is its inability to support documents that require

signatures or include pictures.

Transmission of these types of documents is better suited to image processing. The principal market for image processing is large financial institutions, which have typically been overburdened with paperwork. For example, when questions concerning a customer's bill arise, banks often spend a great deal of time photocopying the bill and mailing it back and forth before resolving the situation. If a bank could simply use image processing to send a copy of a bill, a great deal of time could be saved.

Facsimile machines have been criticized for producing poor quality images. "An image processor could easily replace a facsimile machine," noted Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C.-based consulting firm. He added that the quality of the image processing document would be much higher, even though the price for the two machines is similar.

Not surprisingly, the glimmer of image  
See **Image** page 18

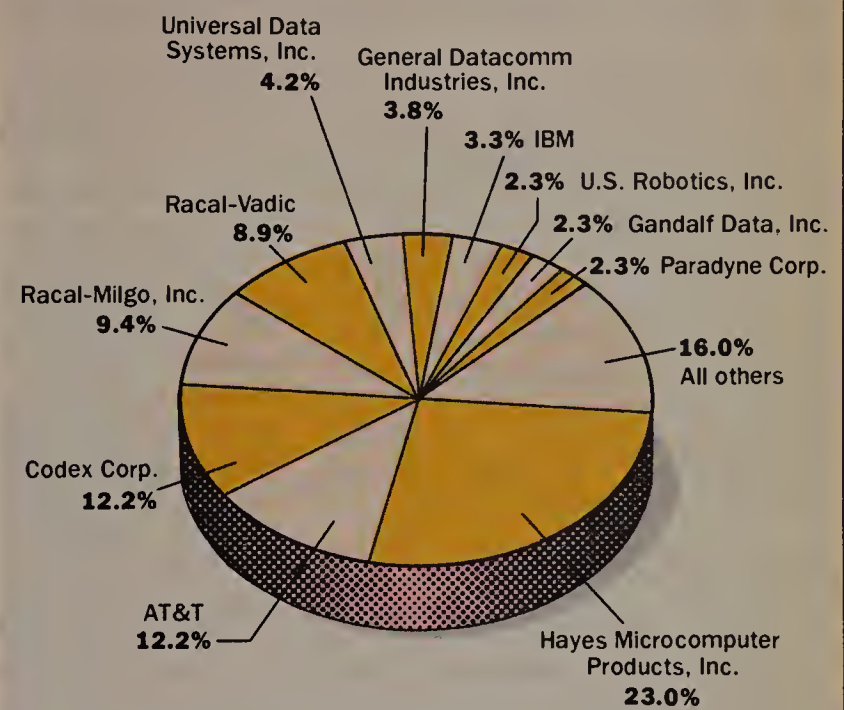
“IBM's recent System/36 announcements are obviously geared to the company's embedded base. The company said it sold 100,000 System/36s. If 90% of System/36 users spend approximately \$20,000 for some of the new features, IBM stands to make close to \$2 billion.

Frank Dzubeck

president

Communications Network Architects, Inc.  
Washington, D.C.

## Who makes the best modem?



Users selection based on 213 respondents.

SOURCE: THE MARKET INFORMATION CENTER, INC., MARLBOROUGH, MASS.

## ► SURVEY

# Modem users plan to pick up the pace

*Shift to higher speeds foreseen.*

BY NADINE WANDZILAK  
Staff Writer

MARLBOROUGH, Mass. — Even though the bulk of modem users transmit data at such relatively slow speeds as 1,200 bit/sec, most plan to migrate to faster speeds.

That finding was listed in a survey called *The Modem Marketplace*, conducted by The Market Information Center, Inc., a market research firm here.

The survey of close to 300 companies found that approximately two-thirds of modem users plan to migrate to higher speed modems.

Almost 50% of the users said their modem operates at 1,200 bit/sec. Approximately 40% said optimal modem speed is 9.6K bit/sec. Only one-quarter of the respondents reported that they are presently working with 9.6K bit/sec transmission speed.

The survey also found that modems are widely used in most corporations. Approximately 95% of the respondents said they use modems, and an average of

52 modems were in use at each site. Almost 78% of the respondents said they plan to purchase additional modems in the next 12 months.

Despite the planned purchases, modem sales may actually slow down in the next few years. Movement to Dataphone Digital Service may reduce the number of modems at each site, according to the survey. Close to 20% of the respondents said they are current DDS users, and 10% said they plan to use DDS. Approximately 40% of the users surveyed were undecided about whether or not to use DDS.

If users migrate toward DDS, there could be serious implications for many modem manufacturers, particularly at the high end of the modem market, according to the survey.

Close to 44% of a company's personal computers have access to a modem, compared with 38% of the terminal users. This statistic does not indicate a one-to-one relationship between modems and microcomputers.  
See **Survey** page 18

## DATA DIALOGUE DON CZUBEK

# APPN an evolving solution

**S**ystems Network Architecture networks were originally designed to support dumb terminals connected to IBM mainframes. The results were hierarchical, host-oriented networks with a relatively static configuration. The proliferation of intelligent workstations, particularly the personal computer, is forcing networks to become more decentralized.

To accommodate this migration, SNA is being forced to change. A key part of this migration will be Application-to-Application Networking (APPN). APPN had been labeled in IBM published research reports as Low Entry Networking (LEN). This column will examine what APPN is designed to do and how it differs from current SNA networking.

The network nodes that make up current SNA networks are divided into two classes, subarea nodes and peripheral nodes.

Czubeck is vice-president of Communications Solutions, Inc., a San Jose, Calif., communications software vendor.

eral nodes. Subarea nodes are either SNA hosts or 3720 series communications controllers, which perform intermediate network routing of data. The peripheral nodes, on the other hand, are located at the end points of the network and don't participate in intermediate routing.

Some examples of peripheral nodes are the 3274 controller, the System/36 minicomputer and the IBM Personal Computer.

As networks become more decentralized, it becomes desirable to perform routing functions at the low end of the network, that is, between peripheral nodes. These smaller processors would then be capable of doing much more than just hanging on a subarea network; they could actually network among themselves on a peer-to-peer basis. This enhanced routing could either supplement the subarea routing or totally replace it with a network that consists of only these smaller processors with no hosts or communications controllers.

See **APPN** page 18

## IBM INSIGHTS

**Hey, what's the rush?** Earlier this month, IBM unleashed its largest product barrage in recent history, including more than 100 new releases. Many of the products will not be available until the end of this year or the beginning of next year. Analysts said that IBM had moved up planned announcement dates for some products so they would coincide with the June 16 product blitz. Analysts speculated that the Big Blue colossus has been less than pleased with its recent growth rate.

Archival Digital Equipment Corp. has been swimming along with increased revenue and profits, while IBM has been struggling to realize moderate growth. The goal of becoming a \$100-billion company by 1990 looks fairly bleak, so IBM may be trying some desperate ploys. By tipping its hand, the company may be able to freeze segments of the market, such as micro-computer-to-mainframe links.

**What do you say now, big guy?** When Data General Corp. enhanced its support of IBM's Dissoss, J. Da-

vid Lyons, DG's vice-president of Business Group Marketing, said that large accounts had become interested in DG because IBM had been unable to supply a viable office automation system. He piled criticism on the System/36, which has been a favorite industry whipping boy, and noted that the system lacked necessary office automation features. This month's product barrage was geared to overcome many System/36 shortcomings. It will be interesting to see what claims DG and other office automation suppliers will be making a year from now.

**What can you do for an encore?** The announcement of the new cluster controller line ended months of anticipation and speculation about the product. Analysts were hard-pressed to point to another unannounced device that might spur as much interest as the controller did. Some mentioned an office-sized version of the IBM 4300 mainframe. Others pointed to increased Token-Ring Network connectivity and possibly some International Standards Organization Open Sys-

tems Interconnect offerings.

**Who's zoomin' who?** No rumor has stepped up to take the place of the recently announced controller. However, that situation should change in the next few weeks. People love to gossip, especially about the rich and powerful. IBM is certainly the richest and most powerful company in the industry. Trouble arises when one tries to separate gossip from the truth. A number of industry luminaries have stated their opinions on the features that the new controller would include. Many of these opinions did not come close to mirroring the new offering.

Where did the misinformation come from? Some leading lights said they talked with users involved with beta tests of the new Model 81C. IBM officials involved with the new controller's development denied that the machine ever had the code name 81C. Did IBM dupe some analysts? Is Big Blue really telling all? Good questions. If you really know the answers, please call us.

### APPN from page 17

Another important difference between APPN and current SNA networks is the way that networks are configured. Currently, SNA networks are statically defined by routing tables within the subarea nodes that are explicitly defined by a system programmer or network operator. APPN supports true dynamic network reconfiguration. When a new node is added to an APPN network, its address is broadcast to all other nodes in the network. This eliminates the dependence on central site configuration management.

How does APPN achieve this decentralized routing and dynamic reconfiguration? It is accomplished through some enhancements to SNA's current LU 6.2 (Advanced Program-to-Program Communications) and Physical Unit (PU) 2.1. LU 6.2 is IBM's standard protocol for Program-to-Program Communications, and PU 2.1 adds peer-to-peer communications capability between peripheral nodes. These two SNA technologies are now widely implemented in products that include the System/36, System/38, Personal Computer and Series/1 minicomputer.

The PU 2.1 node, which is en-

hanced for APPN operation, is referred to as a Network Node. Not all PU 2.1 nodes become Network Nodes in APPN. PU 2.1 peripheral nodes will still exist, and they will be connected to a network through Network Nodes just as they now attach to subarea Nodes in host-based SNA networks.

The Network Node supports a facility known as Connectivity Services, which is responsible for maintaining a network configuration table called the Topology Data Base in each Network Node. Whenever a new Network Node is attached to an APPN network, the node is loaded with a Topology Data Base from one of its adjacent Network Nodes. All other Network Nodes in the network are then notified that a new Network Node has connected to the network.

Network Nodes also contain a Directory Services facility, which is used to locate specific users within an APPN network. When a user wants to establish a session with a user at another logical unit, Directory Services first searches a local directory, which lists all LUs connected to that Network Node. If no entry is found in the local directory, the Network Node looks in a cache directory, which contains a

list of the most recently accessed remote LUs. If that search is unsuccessful, a distributed search of all Network Nodes is initiated to find the name of the Network Node that the remote LU is attached to.

After the target Network Node is identified, the route selection service uses the Topology Data Base to find the best route between the session requester and the target LU. Note that there may be more than one route between any two LUs in the network. At this point a LU-to-LU session can be established across the network.

All of this support is based on existing LU 6.2 and PU 2.1 technologies, which can be upgraded to support the described reconfiguration and full distributed routing capabilities. The result is a network of workstations that does not have to rely on a mainframe for network routing or control functions.

Currently, APPN Network Node capabilities are available only for the IBM System/36. There will probably not be widespread use of APPN for a few years. However, IBM has begun to address the problem of networking large numbers of small systems. APPN is the emerging solution to this problem in the IBM world. ■

### Survey from page 17

ers, the report states, since personal computers often pool modems in a local network.

Five modem manufacturers control more than 50% of the market, according to the survey: Hayes Microcomputer Products, Inc., AT&T, Racal-Vadic, Inc., Racal-Milgo, Inc. and Codex Corp. Many companies use more than one brand of modem.

Users ranked the best modem makers, in order, as Hayes, Codex, AT&T, Racal-Milgo and Racal-Vadic; 90% of the respondents graded

their modem manufacturer as either excellent or good. Only one respondent graded his modem maker as poor.

The key reason for choosing a particular brand of modem was reliability, according to the survey, which offered a 12-item list of possible reasons. Quality and cost were the second and third reasons. The modem market has become a commodity-oriented marketplace, the survey concluded, particularly in the lower end, that is, less than 2,400 bit/sec.

Approximately half of the respondents worked with IBM mainframes. Digital Equipment Corp., Hewlett-Packard Co., Honeywell, Inc. and Burroughs Corp. followed, trailing IBM by major increments.

Annual revenues of the respondents were in excess of \$1 billion. Data and voice communications budgets averaged 1% of annual revenue, or more than \$1 million. The number of employees per company ranged from fewer than 50 (30% of the respondents) to 500 to 1,000 (14% of the respondents). ■

### Image from page 17

processing caught the eye of the brass who rule the industry from their Armonk, N.Y., offices. Rather than being a late arrival, as usual, IBM may be one step ahead of other companies setting their sights on the still emerging market.

The IBM 3117 is a desktop, flat-bed page scanner designed to work with the IBM Personal Computer line and the IBM 3193 terminal. The device is suited for scanning images in bound documents, signature cards, carbon-backed pages or odd-sized documents. It can scan an 8½- by 11-inch page in approximately 30 seconds, and scanned images can be stored on the Personal Computer.

The device has a selectable resolution of up to 240 by 240 picture elements per inch and supplies a bit-mapped image. An 8½- by 11-inch image will require 700K bytes of random-access memory. The device uses a Modified Modified Read compression method, which compresses data at a 27-to-1 ratio.

Image processing programs can control full or partial scanning of documents. One or more rectangular areas on a page can be defined for selective scanning. The user can control darkness, contrast and up to 16 levels of digital halftones.

A Personal Computer can be attached to the scanner in three ways: by asynchronous adapter, serial/parallel adapter or the IBM 3117 Extension Unit, a data compression unit. An IBM 3193 terminal attaches directly to the 3117 Extension Unit.

The IBM 3118 supplies the same basic features as the other IBM image processor but works with a variety of paper sizes and scans images in shorter periods of time. The second image processor can scan an 8½- by 11-inch page in approximately 12 seconds. Also, the high-speed scanner handles paper of various lengths, widths and weights.

An RS-422 interface attaches the IBM 3118 to the IBM 3193 terminal and supports transmission speeds up to 38.4K bit/sec. For Personal Computers, a High Speed PC Adapter provides a 1M bit/sec RS-422 interface. Or 9.6K bit/sec transmission speeds can be supported by an asynchronous communications adapter or by a serial/parallel adapter.

To use a scanner with a Personal Computer, IBM's Image Support Facility 2 is required. The software provides an application program interface so that programmers can write routines to invoke image processing capabilities, such as image manipulation, I/O of image and support for scanners, printers and displays. Image manipulation facilities include move, copy, rotate, scale, reverse, extract, mirror and paint.

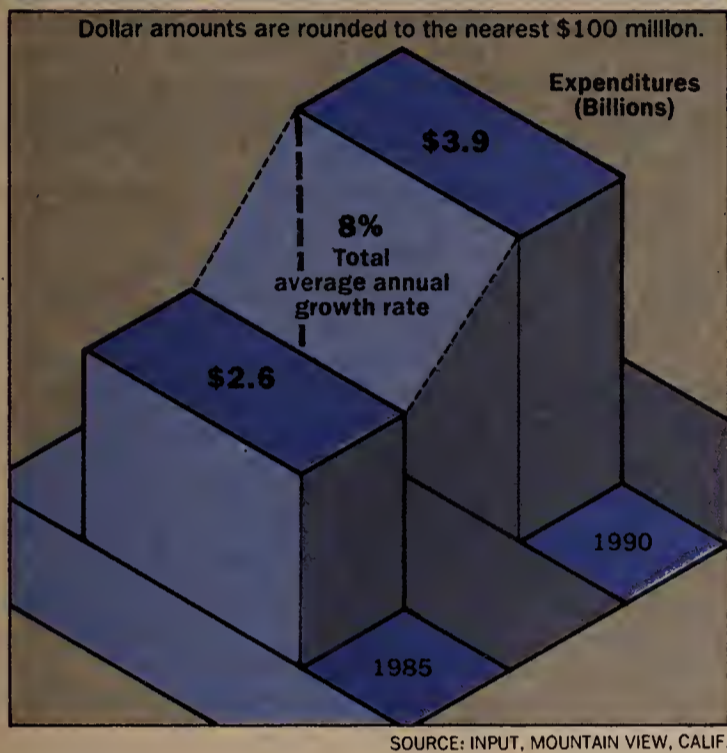
The IBM 3117 costs \$1,095, the 3117 Extension Unit sells for \$700, and the 3117 PC Adapter is priced at \$240. The IBM 3118 sells for \$2,350, and the High Speed Adapter costs \$295. The IBM Image Support Facility 2 is priced at \$95. All products are scheduled to be available in September. ■

# TELECOM TRENDS

## International satellite services offered

Overseas Telecommunications, Inc. of Alexandria, Va., recently began offering international satellite services from its newly operational earth station in Chicago. The nine-meter earth station will provide dedicated links between area businesses and Europe, Canada, South America and Mexico. The shared use facility will, in the future, be accessible by fiber-optic and microwave links.

### Federal telecommunications market forecast 1985-1990



### ► ANALYSIS

## IBM backs Ethernet

*RT-PC adaptor gives 1st IBM Ethernet support.*

BY JOHN DIX  
Senior Editor

IBM is using board-level products from Ungermann-Bass, Inc. in its first ever support of Ethernet network technology, industry analysts report.

Although both companies declined comment, industry watchers say Ungermann-Bass is the likely supplier of the Baseband Adapter for the IBM RT Personal Computer announced in the product blitz two weeks ago.

Ethernet support for the RT is significant because Ethernet is the de facto local network of choice in the RT's targeted market, the computer-aided design and manufacturing industry.

But the announcement is perhaps more in-

teresting because it is the first time the main-frame maker has recognized Ethernet, the oldest, most widely used and broadly supported local network technology.

"For once IBM has been forced to do something other vendors were doing, instead of the other way around," noted J. Scott Haugdahl, senior systems specialist with Architecture Technology, a research and consulting firm in Minneapolis.

The IBM Baseband Adapter enables customers to tie RT Personal Computers to standard diameter or thin-cable, 10M bit/sec Ethernet networks. Ethernet connections are supported by a new version of the IBM Advanced Interactive Executive operating system, Version 1.1. The new operating system version supports the Department of De-

See RT page 20

### ► 56K BIT/SEC LINKS

## NY Tel unveils super Centrex

BY JOHN DIX  
Senior Editor

NEW YORK — New York Telephone Co. filed a new high-end, central office-based Centrex service with the state utilities commission two weeks ago that it hopes to have approved by mid-August. Intellipath II is intended for companies with 100 or more stations and boasts a host of new management features and data support at speeds up to 56K bit/sec.

Intellipath II complements Intellipath I, a digital Centrex service introduced last year for users with fewer than 100 stations, and adds more than 100 new features, according to Joe Gustafson, division staff manager of marketing and planning.

Perhaps the most interesting of the new Intellipath II features are those that provide service management, control and administration. Using a personal computer, communications managers can access usage data, such as station message detail recording reports, and check traffic, feature and routing information. Managers also can change routing configurations on a real-time basis.

"If AT&T service is cheaper

from 9 to 12 in the morning," Gustafson explained, "the communications manager can route all traffic over AT&T. If MCI becomes cheaper at noon, he can reroute the traffic to that carrier."

A new system administration feature enables customers to change station class of service online or to perform group changes. Gustafson said a company may, for example, want to restrict outside calling for some or all telephones after closing to limit unauthorized calling. Station features can be added or deleted when required.

Station features now include roughly 30 options, such as call waiting, call forwarding, speed dialing and automatic call back. Receptionist features were also enhanced and now include night service, attendant access to paging, attendant conferencing and speed calling.

Data support with Intellipath II is provided over 56K bit/sec digital facilities dedicated to data support. Attached devices can be switched to other 56K bit/sec lines in a simple data switching fashion once within the central office.

Gustafson said Intellipath II will only be available from central of-

See Intellipath page 20

### CROSS TALK

JOHN DIX

## Poppycrack and Ethernet

Contrary to some trade press reports, Ethernet is not dead or even dying.

A few industry spectators, it seems, have concluded that IBM's Token-Ring Network and AT&T's Information Systems Network will squeeze the local network workhorse out of existence.

Poppycrack.

While the newcomers can't help but take market share from the tried and true, Ethernet is here for the long term. Its longevity is guaranteed by its broad range of backing, ranging from the smallest personal computer add-on vendor to industry giant Digital Equipment Corp. And now IBM.

The simple fact of the matter is that Ethernet has become a de facto standard in environments such as education and computer-aided design and manufacturing (CAD/CAM). IBM finally admitted as much when it announced Ethernet support for its RT Personal Computer (see "IBM backs Ethernet," above).

It is true, however, that Ethernet will suffer under the onslaught of the IBM Token-Ring and AT&T's Information Systems Network. Regardless of technical merit, IBM and AT&T have two advantages: They sell hardware that attaches to the

network, and they sell basic building wiring schemes on which they layer their networks.

Many users will be inclined to install either an IBM Cabling System or AT&T Premises Distribution System because, the logic goes, they are the largest computer system and telephone system suppliers, respectively. Selling vendor-specific networks is made easier when the same vendor's wire is in the wall.

Wire is, in fact, one of Ethernet's major shortcomings at this point. Even thin Ethernet — smaller than the diameter of a drinking straw — is more expensive, less flexible and less prevalent than the twisted-pair telephone wire many network vendors, including IBM and AT&T, claim to be able to use today.

This point alone makes it unlikely that many more companies will install Ethernet as a corporatewide network. Instead, Ethernet will be relegated to departmental use and demanding applications such as CAD/CAM.

IBM, AT&T and other local network vendors have an uphill fight to compete against Ethernet technology at this level. The sheer number of Ethernet vendors and range of products is staggering.

**RT from page 19**

fense's Transmission Control Protocol/Internet Protocol, enabling RT Personal Computers to share files, applications and printers. The card will be available in September for \$850.

**Natural cooperation**

Although neither company would confirm or deny Ungermann-Bass' involvement with the IBM product, analysts say cooperation would be natural given their existing relationships. IBM has a joint development agreement with Industrial Networking, Inc., a company jointly owned by Ungermann-Bass and General Electric Co. that is involved with factory networks. According to Haugdahl, Un-

germann-Bass was also involved in the design of the IBM Token-Ring Network board for the Personal Computer.

Further evidence of the close relationship between the companies can be gleaned from the fact that Ungermann-Bass is, according to its own claims, the first local net-

work supplier to ship IBM Token-Ring-compatible networks.

Eric Killorin, president of Hyatt Research Corp. in Andover, Mass., backs Haugdahl's claim that Ungermann-Bass helped IBM develop the Token-Ring interface for the Personal Computer. He said IBM's endorsement of Ethernet is of some

consequence, but points out the RT is targeted at a narrow audience, which limits its importance.

Bob Metcalfe, chairman of network maker 3Com Corp. and inventor of Ethernet, said, "One of the principal defects of the Ethernet enterprise has been its inability to get IBM on board. This may be evidence that IBM is creeping in through the back door."

Metcalfe said that he predicted two years ago IBM would support Ethernet in August of this year. "I predicted IBM would begrudgingly commit to Ethernet where it had become established as a standard, as it has in education and computer-aided design and computer-aided manufacturing. I was off by a few months." ■

*"IBM's endorsement of Ethernet is of some consequence, but the RT is targeted at a narrow audience, which limits its importance."*

# Network World.

## There's no better place to recruit communications professionals.

The best communications people don't always look through the Sunday classifieds for employment opportunities. But they will read the recruitment pages in *Network World*. Because, unlike the help wanted sections of local newspapers, *Network World's* recruitment advertising targets job openings for communications professionals.

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# NETWORK WORLD

The Weekly for Leading Users of  
Communications Products & Services.

**Intellipath from page 19**

fices with digital switches. He estimates that roughly 50% of New York Telephone's central offices will be digital by mid-1987. Today only one-third of its switches are digital.

Intellipath II will be offered on a one- to 10-year contract basis. The longer the contract, the lower the price per line per month. The price also declines with quantity. Customers can also lower their monthly fees by paying for a percentage of the service up front.

An Intellipath II digital Centrex user with 2,000 lines — 100 of which are 56K bit/sec lines — an average group of features and a five-year contract would pay \$19.50 per line per month, Gustafson said. That price drops to \$18 per line per month with a 10-year contract.

The price stability plans will also be extended to existing Centrex services, resulting in reduced prices through 1997, the company reported. The plan is a guarantee

*"Customers can lower their monthly fees by paying for a percentage of the service up front."*

included in the Centrex service contract that the telephone company will not seek increases in Centrex monthly charges for the length of the contract.

According to Francis Austin Jr., executive vice-president and chief operating officer of New York Telephone, Intellipath II is the next logical step to Integrated Services Digital Networks.

Intellipath II is not part of Intellihub. Intellihub is a recently announced network capability that enables customers to coordinate traffic from multiple private branch exchanges. ■

# COMMUNICATIONS MANAGER

“Not everyone has clout with vendors, and unfortunately, it seems that the user who does the most screaming is the one who gets the service job done.”

**Donald Dunn**

director of information systems  
Nabisco, Inc.  
Cambridge, Mass.

## ► PRODUCT SUPPORT

# Service backslide can blemish a big buy

*With many vendors, the honeymoon is over once the sale is made.*

**BY MARGIE SEMILOF**  
Senior Writer

Does the quality of vendor maintenance and service degrade once the vendor has locked the user into a large equipment investment? Users say it depends on the vendor and on how much clout the user company wields. Many users report that once the initial vendor/user sales courtship is over, the service honeymoon is over too.

Service backslide seems to be more prevalent for companies that are seeking as much of a single-supplier environment as possible. It is also more common in companies that have made a particularly large investment in a product, say a private branch exchange, and when the vendor knows the user is unlikely to replace the equipment soon.

Donald Dunn, director of information systems at Nabisco, Inc. in

Cambridge, Mass., said that the size of his company's account helps draw some attention for service.

“Not everyone has clout with vendors,” he said, “and unfortunately, it seems that the user who does the most screaming is the one who gets the service job done.”

But Dunn said Nabisco is not exempt from sluggish vendor service response time. He said he noticed a marked drop in service from his vendor shortly after investing in a new Rolm Corp. PBX.

Dunn said he likes the product itself, but that his company never received promised support from a Rolm network monitoring system designed to spot line outages. Instead, most outages are first discovered through Nabisco's own switchboard and Dunn's staff must alert the vendor service staff.

“The vendor's management team should be more aware of what service-level people are doing,” he

said. “You can get a fancy contract that promises you response time. But many times I will call the vendor and they promise me they will respond within two hours. Nothing happens. You call them back and they promise to call you in ten minutes. They never do.”

Dunn suggests keeping a file of service supervisors and managers. If the user is calling in for a specific problem, he should always seek out the most senior service manager in the vendor's organization.

Kathleen King, manager of technical support services at the U.S. Chamber of Commerce in Kensington, Md., said she changed packet-switched network vendors from GTE Telenet Communications Corp. to Tymnet/McDonnell Douglas Network Systems, Inc. because of degrading service.

The Chamber of Commerce uses the packet-switched network to link its remote sites. King said she was actually taking a bigger chance switching vendors because she invested in the carrier's proprietary IBM 3270 conversion software for

several applications.

“The decision to switch had nothing to do with money,” she said. “The other vendor's sales staff was unresponsive. When I called in to report an outage the staff fought with me.”

### Users abandoned after the sale

Many managers claim that the vendor sticks by the user until the sale is made. Sunny Pritchard, data entry manager of the Chamber of Commerce, noted that after the sale, the user is often shunted into a queue to wait their turn for service.

“I have called the vendor and had them tell me they meant to come out and service our equipment, but they got sidetracked,” she said. “If I have to complain several times, my grievances go into writing. The situation usually changes when people see that it was a big enough complaint to notify others.”

Pritchard advised users to avoid calling vendors unnecessarily. Unfortunately, service teams may respond sooner if they realize the user is not a chronic complainer.

“You begin to know the service people on a personal level,” she said. “When I call to say I need service, I want them to realize I really need help.”

Still, some users maintain that those who seek a single-vendor environment are simply setting themselves up to become dependent on that vendor's service staff. ■

## ASSOCIATIONS

**Fox Research, Inc.** is organizing a users group for its 10-Net local network customers. For more information, contact Pat Brady at Fox Research, (513) 433-2238.

### Notes from the recent Rolm Users Group meeting

**Upcoming conference** — The National Rolm Users Group (Nrug) will meet with Rolm Corp. representatives during a two-day conference and business meeting next October in Santa Clara, Calif. For more information, call Nrug President Charles Garrison in Chicago at (312) 786-7201.

**Officers elected** — Nrug members elected Charles Garrison as users group president. Garrison is telecommunications director for the Chicago Board Options Exchange. The vice-presidents are Donna Turcany, telecommunications director for the American Medical Association, and Bill Theobald of M/A-Com, Inc.

Nrug membership is open to any organization using a Rolm system.

## GUIDELINES

MARGIE SEMILOF

# Communication begins at home

**A**s some communications managers have discovered, end users will seek the path of least resistance when it comes to solving networking problems. If users don't think their communications management team is recommending effective solutions or implementing equipment to solve their problems, they may find someone else — a vendor, perhaps — who will.

Managers claim that it is not uncommon for end users to mistrust the abilities of communications management. They say corporations most vulnerable to this lack of cohesion are those with business units that are loosely tied to MIS departments.

Managers claim that this situation is least likely to occur in a corporation with a huge host environment. In these cases, users tend to be reminded where the

information comes from and are conditioned to the benefits of a central system. Users not accustomed to having a central location may not be accustomed to listening to a communications manager.

Perhaps the most serious result of poor communication between management and end users is the proliferation of islands of incompatible equipment. To avoid disunity, the most active supervisors should be encouraged to become as ingrained in as many corporatewide networking activities as possible. Several communications managers have provided their tips for improving management and end-user relationships.

- Avoid an adversarial relationship with end users. Position yourself as a user advocate.
- Try to soak up as much com-

munications education as you can. If you become known as an information source, end users will turn to you first when they have networking problems.

■ Make a special effort to understand your end users. The best way to do this is to work with them on their own turf. Even if you run a national network, meeting with your end users will heighten your visibility and help establish a closer working relationship.

■ The more users trust communications management, the more they will seek and honor corporate vendor agreements when it comes to equipment purchases. Managers agree it could be disastrous to long-range strategic planning if one division independently implements a networking tool before checking with central communications management.



*AT&T 724 Multiplexer*

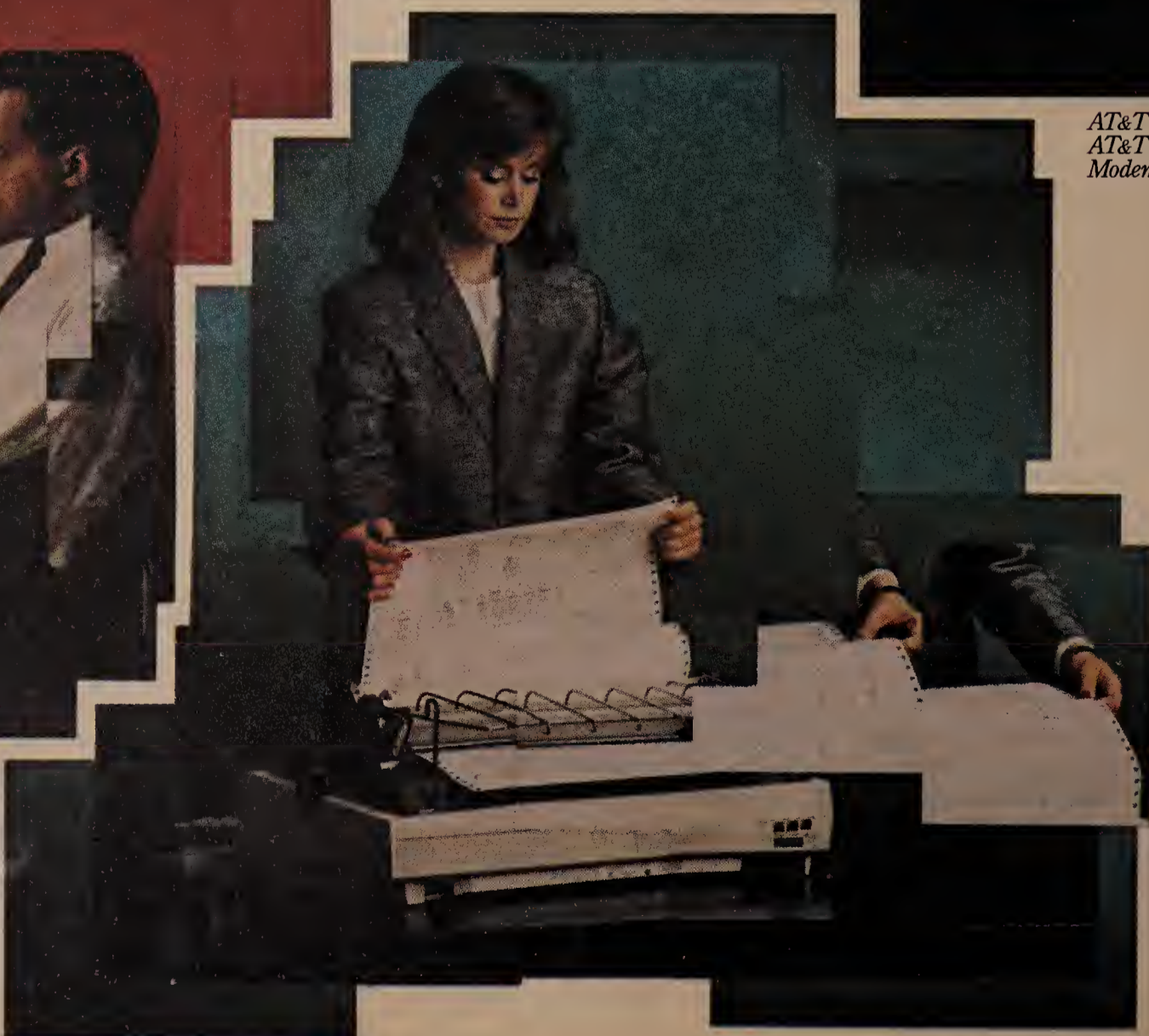
*AT&T DATAPHONE II  
System Controller*



*AT&T PC 6300  
AT&T Model 4000  
Modem*



*AT&T Multifunction Communication System*  
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*AT&T 455  
Printer*

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AT&T's approach to network management and control reflects a century of communications experience. And a century of leadership.

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It's a full line of modems, Data Service Units and multiplexers that combine network managing and diagnostic capabilities to deliver maximum uptime from an integrated *system*.

**The mainframe connection.** When you're in the 3270 environment, the AT&T 6500 Multifunction Communication System makes a lot of sense. Full compatibility, access to multiple synchronous or asynchronous hosts, plus powerful multitasking, put maximum mainframe muscle on the desktop.

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**We make the pieces fit.** Flexibility and adaptability set AT&T networks apart in both local and departmental use. Systems like the AT&T STARLAN NETWORK and 3B NET give you the network best suited to corporate requirements with no sacrifice in control of your computer resources.

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# NEW PRODUCTS AND SERVICES

## ► NETEXPRESS SYSTEMS

# Global office net unwrapped

*Up to 32 remote locations linked.*

BY JIM BROWN  
New Products Editor

A system that integrates personal computer applications with laser printer and copier functions over the worldwide telephone network was unveiled recently by Netexpress Systems, Inc., a division of Netexpress, Inc. and an affiliate of DHL Worldwide Courier Express.

The Netexpress 2100 Global Office is being touted as an office integration system that allows users to exchange or share documents or files containing text, graphics or photographic images with up to 32 remote locations. At the heart of the system is a communications controller and communications software interfacing a specially adapted Canon U.S.A. laser printer and copier with an IBM Personal Computer AT.

The communications software interfaces the system to the public switched telephone network or provides access to a private network operated by a sister company, Netexpress Communications, Inc. The system will also be installed in DHL Worldwide Express offices.

Users of the systems can prepare documents for transmission in three different ways. First, users of the system's Scan & Save Filing component can feed an existing

document into a scanner installed in the Canon laser printer and copier, which will then convert the bit-mapped images created by the scanning process into compressed digital signals that are stored on an 86M-byte disk provided with the Personal Computer AT. Secondly, users of the office automation system component can create and file new documents on the Personal Computer AT. Finally, elements of scanned-in documents can be merged with other documents.

The controller on current systems resides in the copier, but the firm plans to implant the controller on an expansion board in the Personal Computer AT. "Canon actually produces that controller for us at the moment. We're going to make our own controller that will be forged within the AT," said Lawrence Roberts, chairman of Netexpress Systems and Netexpress Communications.

The digitized documents are transmitted from the communications port on the Personal Computer AT at speeds of 9.6K bit/sec. Documents can be sent either directly to another Netexpress 2100 Global Office system over the dial-up telephone network or to a private network. Transmissions are packaged in the error-correcting X.25 packet protocol and are recon-

See inside for:

- Coaxial-to-twisted-pair coupler
- Video coder/decoder software
- Cutover switch



verted at the receiving end. Communications interfaces supported by the system include V.35, V.24 and RS-232-C. The firm expects to support the X.21 communications interface in a future release.

Roberts said the Personal Computer AT serves as the communications and printer server for the system. Netexpress Systems provides an expansion board allowing the Personal Computer AT running under Microsoft Corp.'s multiuser Xenix operating system to serve as a host computer supporting up to 15 attached terminals.

Using a system component called Docu-Conference Communications, up to 32 sites can have concurrent and interactive access to a single document. Any location in the Docu-Conference can initiate changes to the document until the document is complete and is printed in final form at all locations.

DHL will use the system for its own overnight worldwide document delivery service, Roberts said. "We're putting machines at all the DHL sites and using DHL for delivery of documents to addressees," he said. By placing Netexpress 2100 systems in all DHL offices, Roberts added, users equipped with their own system can trim courier charges by forwarding a document to any DHL office, which will hand-deliver it to other offices not equipped with the system.

Roberts said Netexpress Systems is working on a package that will interface a local-area network with the system and that the system will soon support transmissions over private X.25 leased lines at between 9.6K and 64K bit/sec. Support to transmit to CCITT Group III- and Group IV-compatible facsimile machines is also under development, according to Roberts. □

## ► IBM

# Terminals shine in IBM's latest product-fest

*Five new models debut; others enhanced.*

RYE BROOK, N.Y. — Almost hidden among the plethora of products unleashed by IBM on June 17 were a number of new terminals connecting to IBM mainframes and minicomputers. Enhancements to other terminals connecting to its 4361 mainframe were also announced.

In all, the firm introduced three new terminals — the 3191, the 3193 and the 3194 — that connect to the IBM mainframe world, and two new terminals — the 3196 and the 3179 Model 220 — that connect

to System/36 and System/38 minicomputers. The firm also introduced enhanced models of its 3161 and 3163 Ascii terminals for the 4361 mainframe.

The 3193 terminal displays alphanumeric information and images scanned in from the recently announced IBM 3117 or IBM 3118 image scanners. The 15-inch black and white screen has a resolution of 880 horizontal dots by 1,200 vertical dots and will display up to 48 80-character lines of combined or

stand-alone image and data. The 3193's internal Intel Corp. 80186 microprocessor gives the user a logical terminal supporting the concurrent display of two host sessions on the screen. The logical terminal also supports up to eight screen partitions, or active screen work areas.

Used with an image scanner, the 3193 can sidestep the data entry process by displaying completed data forms on screen for error checking before they are moved to an IBM mainframe for storage. The 3193 connects to 3270 series devices over shielded twisted-pair or coaxial cable and will be available in September for \$2,495.

Also connecting to the 3270 world, the 3194 is a 14-inch color terminal with an 80-column by 24-row screen displaying seven colors on a black background. The termi-

nal's logic unit will support up to four concurrent host sessions in a transaction processing environment. An internal 3.5-inch diskette drive supporting 720K bytes of local storage allows 3194 users to transfer files from the host to the diskette and to copy data between sessions. The 3194 will also support a 30,000 character programmable key memory. The 3194 connects to the host with coaxial cable. Listing for \$2,895, the first models of the 3194 will be available late this year.

The 3191 terminal communicates with the 3270 line as well and is available with either a green or amber-gold phosphor 12-inch screen with an 80-column by 24-row display. It is used for interactive processing with the host and will emulate a 3278 Model 2 terminal. The 3191 terminal connects to the host

## ► LOCAL NETS

## Tool offers Sun link

CUPERTINO, Calif. — Network Innovations Corp. announced a package that allows popular personal computer software to access shared data bases residing on Sun Microsystems, Inc. Unix-based workstations or network servers.

Called the Multiplex Network File System (Multiplex-NFS), the package is a new version of Network Innovations' Multiplex networking software. It operates on Sun Microsystems' recently released Personal Computer Network File System (PC-NFS) software. The Multiplex-NFS resides in Sun Microsystems file servers and is downloaded into the personal computer when needed.

With Multiplex-NFS, personal computer users can browse through multiuser data bases stored on a Sun Microsystems Unix-based network, select the data needed and extract that data across the network into an automatically formatted personal computer file. The company claims the product will link applications such as Lotus Development Corp.'s 1-2-3 spreadsheet, Ashton-Tate's Dbase data base management software and Micropro International Corp.'s Wordstar word processing package with Sun Microsystems networks.

The company claims the package goes beyond terminal emulation or file transfer packages that move data from one system to another. The package implements a personal computer user interface similar to Lotus' 1-2-3 spreadsheet user interface, which allows personal computer users to browse through data bases stored on the network in a manner similar to that of browsing through a spreadsheet locally.

The Multiplex-NFS package will be available in 60 days. Package prices are based on a single installation on a per-Sun Microsystems network server basis. Prices start at \$1,195. ▢

through IBM cluster controllers and is available for \$1,295.

The 3196 terminal communicates with the 5250 line, is compatible with the 5291 Model 2 and provides System/36 and System/38 minicomputer users the same functions as the 3191. The 12-inch monochrome screen displaying 80 columns by 24 rows of data is available in green or amber-gold. An added feature of the 3196 is its 1,500 keystroke programmable key memory. The 3196 attaches to the host over twinaxial cable and is available now for \$1,295.

The 3179 Model 220 color terminal communicates with System/36 and System/38 minicomputers and can be used for word processing, personal computer or interactive host applications. In addition to performing the functions of the 3179 Model 200, the 3179 Model

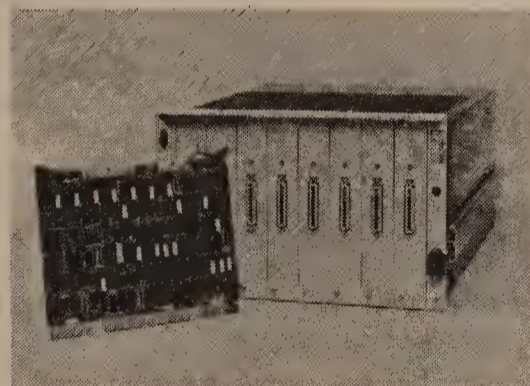
### Coaxial-to-twisted pair coupler

Avatar Technologies, Inc. introduced a coaxial-to-twisted pair coupler designed for IBM 3270 series devices.

A pair of **DC202 Coax Baluns** couplers will connect IBM devices over a distance of up to 1,200 feet. A DC202 Coax Baluns on one end of a link takes the signal from the coaxial wire of an IBM 3274 or IBM 3276 communications controller and converts it to a signal compatible for transmission over modular telephone cable or twisted-pair wiring. A DC202 Coax Baluns at the other end will convert the modular telephone cable or twisted-pair wire signal back to coaxial cable, which then connects to a 3270 type terminal, printer and other peripheral. One side of the DC202 Coax Baluns has a male connector, which attaches to a coaxial cable up to 400 feet long. The other side has a RJ11 connector.

A pair of DC202 Coax Baluns costs \$80.

Avatar Technologies, Inc., 99 South St., Hopkinton, Mass. 01748 (617) 435-6872.



### Q-bus to controller adapter

Able Computer, Inc. announced that its new **Q-Host adapter** will support attachment of Digital Equipment Corp. MicroVAX II and other Q-bus-equipped computers to Able's Attach communications controller network.

With the new product, Able's Attach controller now supports attachment of up to 128 terminal lines per subsystem to Unibus- or Q-bus-supported minicomputers.

220 has enhanced keyboard features. The 3179 Model 220 is currently available for \$2,195.

IBM's 3161 and 3163 Ascii display station models are now available with 12-inch amber-gold screens and either an RS-232-C or RS-422-A interface. The 3161 is also offered with optional plug-in emulation cartridges. One cartridge will support emulation of Televideo Systems, Inc.'s Model 910+, Model 912, Model 920, Model 925 and Model 925E terminals and will add 32 definable function keys to the keyboard.

The other cartridge supports extended Ascii allowing the 3161 to emulate Lear-Siegler, Inc.'s ADM-3A and ADM-5 terminals, Hazeltine Corp.'s Model 1500 terminal, Applied Digital Data System, Inc.'s Viewpoint A2 terminal, Televideo's Model 910 terminal and IBM's 3101

## PRODUCTS & SERVICES

The Attach controller attaches to the host via a dual, twisted-pair composite link cable that runs up to 1 km in length. The Q-Host fully emulates the eight-line DEC DHV-11 interface multiplexer on the MicroVAX II, allowing Direct Memory Access or single-character programmed transfers. All DHV-11 features are incorporated, including a 256-character dynamic input buffer that adapts to the input traffic of all eight lines. The Q-Host adapter also has a selectable input silo delay and supports RS-232, RS-423-A/V.10/X.26 interfaces and is compatible with 16-, 18- and 22-bit Q-buses.

A Q-Host adapter is \$3,495.

Able Computer, Inc., 3080 Airway Ave., Costa Mesa, Calif. 92626 (714) 979-7030.

### Software for video coder/decoder

PicTel Corp. announced a new software package for its C-2000 video coder/decoder that boosts the system's operating range from 128K bit/sec to 168K bit/sec.

The company's first package, MCT-100, was designed primarily for videophones or videoconferencing applications that would run on public switched networks at speeds of 56K bit/sec. By operating up to 168K bit/sec, the **MCT-200** allows hybrid videoconferencing networks with both switched 56K bit/sec networks and higher speed private transmission circuits with the same coder/decoder.

The MCT-100 and MCT-200 are compatible at transmission rates up to 128K bit/sec and can be intermixed in the same network. Electronic data may be transferred directly through the coder/decoder without additional data circuits. PicTel offers the MCT-200 without hardware changes because the C-2000 is a software-based video coder/decoder.

The MCT-200 will be available this fall and is priced at \$9,500.

PicTel Corp., One Intercontinental Way, Peabody, Mass. 01960 (617) 535-7700.

Model 881 terminal. The extended Ascii cartridge adds 24 definable function keys to the keyboard. Both cartridges also support three program attention keys, a mono/dual case selection and an option to make a 25th screen line displayable.

Both the 3161 and the 3163 connect to either an IBM Personal Computer AT model in a multiuser Xenix operating system environment or to an IBM 4361 mainframe over RS-232-C or RS-422-A interfaces or an asynchronous modem. The 3161 with RS-232-C costs \$695; with RS-232-C and RS-422-A, it costs \$774. The 3163 with RS-232-C is \$895; with RS-232-C and RS-422-A it costs \$974. The Televideo and extended Ascii emulation cartridges cost \$35 each. The enhanced 3161 and 3163 terminals are currently available. ▢



### 3M cutover switch

3M Corp. has introduced a new cutover switch designed to test circuits in remote central office cutovers.

The **Control Feeder Block** has individual binding posts, which form a single-pole, double-throw switch. Each block contains 50 binding posts for wiring 25 circuits. Cable can be spliced into these blocks with standard 25-pair modular connectors.

To ease installation of a cutover between a new and an old central office, the splicer taps the existing user and central office cable to the tail from the back of the Control Feeder Block. The splicer then attaches the new central office cable to the tail from the binding posts in the front of the Control Feeder Block. With the binding post pulled out, a circuit is connected from the old central office to the user without a bridge tap from the new central office cable. With the new binding post pushed in, the central office is connected to the user, dropping the bridge tap from the old central office.

The Control Feeder Blocks are delivered in frames that fit standard 4200 cabinets. The most common size frame accommodates 24 Control Feeder Blocks with a total capacity of 600 pair cutovers. A flexible range of frame and cabinet sizes can accommodate 300 to 3,600 pairs for custom fits.

Prices for the Control Feeder Block begin at \$128.75.

3M Corp., Department T186-09, P.O. Box 2963, Austin, Texas 78769-2963 (512) 834-6563.

### Fiber-optic link

Raycom Systems, Inc. introduced a fiber-optic link that is compatible with IBM coaxial cable connections.

The **Raycom 3200** fiber data link system consists of two pieces. One device converts coaxial cable to fiber cable transmission media, and the other converts fiber back to coaxial. The system can be used for connections between IBM 3274 or IBM 3276 communications controllers and IBM 3278 terminals. It can also be used to connect local IBM Model 3299 multiplexers or to connect terminals to a remotely located multiplexer.

The Raycom 3200 supports transmissions at speeds up to 2.35M bit/sec and distances up to 1.5 miles.

The Raycom 3200 lists for \$695.

Raycom Systems, Inc., 6395 Gunpark Drive, Boulder, Colo. 80301 (303) 530-1620. ▢

## TECHNOLOGY

MICHAEL DURR

# Local net to mainframe links

Not long ago, gateways between local-area networks and mainframes were scarcer than sport coats at an IBM convention. Vendors talked about gateways, but it was difficult to get delivery dates.

A gateway is a device that translates between two different communications protocols so that one system can talk to another. In local-area networks, the term also implies an intelligent resource that can be shared by all network users. To be more precise, it is a communications server, but most people call it a gateway. There are now dozens of gateways that offer a version of the local net-to-mainframe connection. All this newly available technology leaves end users with two questions: "Do I want a gateway or an individual emulation package for each personal computer?" and, "If I decide to use a gateway, which features do I look for?"

Gateways bring up the issues of cost and management. If a site has a local-area network, but only two or three of the personal computer workstations need mainframe connectivity, an emulation package is the logical choice. However, if many workstations on a local net need to be tied into the mainframe, a gateway is much more economical.

A 3270-emulation package for a personal computer costs about \$1,000. The 3270

*Durr is public relations manager for Novell, Inc. in Orem, Utah, and author of several books, including Micro to Mainframe, published by the Addison Wesley Publishing Company, Inc.*

emulator connects to a 3274 cluster controller that costs more than \$750 per port for a total of \$1,750 per mainframe connection. In comparison, a 16-port gateway that emulates a 3274 controller costs around \$4,500, or \$282 per port. No special hardware is needed for individual workstations, and any workstation on the local-area network can connect to the mainframe.

The gateway also permits better management of communications and mainframe processing resources. A gateway allows many users to have mainframe connectivity, but the MIS manager is able to limit the number of simultaneous sessions from the local network to the mainframe by restricting the total number of available gateway ports. A 25-workstation departmental local-area network may have an eight-port gateway, which reduces the potential load on the mainframe system. Later, if eight ports are not enough, another gateway can be added, or a few existing ports can be dedicated to certain users. And the MIS manager continues to control resource use.

## Selecting a gateway

Compatibility is critical when selecting a gateway. Many products provide only partial emulation. That may be fine, as long as there is functionality. In the 3270 world, for example, IBM provides very useful network diagnostic tools, some of which require the 3274 controller to keep statistics. However, not all 3274 emulation products can support this level of diagnostics. Another consideration is the gateway's processing

power. The gateway function is processor-intensive because it requires protocol conversions and a heavy load of data transfers. If the gateway is underpowered, it may say it offers 32 ports when, in fact, it can really only support eight or nine concurrent sessions.

There are three general gateway configurations. The first is a circuit board that runs in a network server. Another is a circuit board that runs in a nondedicated personal computer workstation. And the third type is a personal computer or other machine dedicated to the gateway function.

Installing the circuit board in the server guarantees reduced performance of the gateway and the server. Even if the gateway circuit board has its own coprocessor, the fact that the server and the gateway share a common bus inside the server will slow down throughput. The access speed on the bus becomes the system's limiting factor. Because it frees another workstation, the nondedicated personal computer gateway is usually more desirable than the dedicated machine. In either case, the gateway should have enough onboard processing capability to supplement the personal computer's limited processor. The gateway may even have enough power to operate virtually independent of the personal computer.

The differences in functionality show up in the software. Most gateways support multiple concurrent sessions at individual workstations. But the number of sessions, the mechanism that allows multiple sessions and

See Gateways page 38

## VIDEO WORKSTATIONS

WALTER ULRICH

# Their time has come

In 1960, no one had ever heard of the personal computer, but everyone knew what AT&T's Picturephone was.

Twenty-five years later, there were five million intelligent workstations in businesses, but nary a Picturephone. Unfortunately, the video telephone was ahead of its time and its costs were prohibitive for most users. Today, however, the the videophone scenario is gradually changing.

The Picturephone was AT&T's first attempt at transmitting a full-motion image accompanying a telephone call. Last year, Datapoint Corp. introduced the Minx video workstation. A far cry from the original Picturephone, the Minx unit sends and receives a full-motion color video image.

The workstation includes a 14-inch display screen, an autofocus video camera with a wide-angle

lens, a full-duplex speakerphone and connections for both personal computers and local-area networking. Video conference control features make it seem natural for several people to be in conference at the same time, and auxiliary cameras can bring out fine visual details.

In addition to full-motion video, some workstations provide freeze-frame images. Freeze-frame is similar to sending a succession of photographs: The sending device transmits an image every few seconds. The primary advantage of freeze-frame over full-motion video is that it requires far less communications bandwidth.

The image is not sent in real-time, because it takes time to transmit the full picture as a single frame. Examples of freeze-frame workstations include the Photophone by Image Data Corp. and Luma by Luma Telecom, Inc.

Video workstations have not received the serious attention they

deserve. They have become quite powerful and user friendly, and the picture resolution is excellent. Now that the technology finally exists, communications managers must not overlook applications. Here are several examples.

A small number of top U.S. companies have discovered the value of videoconferencing. Some have invested more than a million dollars in sophisticated videoconferencing rooms. Video workstations can extend the value of videoconferencing in two ways.

First, top executives in these companies are often busy. They would like to monitor an ongoing videoconference, but do not want to participate in the whole session. With the video workstation, they can monitor the conference from their office and when they want to participate they are able to do so.

Second, a personal video workstation also makes it possible to extend the benefits of videoconferencing to locations where the

construction of a videoconference room is not justified. The video workstation extends the geographic reach of the conferencing network and leverages the investment in videoconferencing that already has been made at other locations.

In the case of an emergency, video workstations enable people to communicate quickly and effectively without leaving their work places. Imagine how much more effectively the Soviets could have

*"A far cry  
from the  
original  
Picturephone,  
Minx sends  
and receives  
full-motion  
color video."*

*Ulrich is president of Walter E. Ulrich Consulting, Inc. in Houston.*

► TELETOONS By Phil Frank



handled the Chernobyl nuclear plant incident had they been able to communicate with one another "face-to-face."

Video images of the situation on-site could have been transmitted to government leaders and scientific experts without lengthy travel delays and without endangering them. Visual information and video meetings would have surely produced a more effective reaction to the catastrophe.

The goal of expert systems is to extend the reach of human experts by codifying their expertise in computer instructions. This lets technicians take advantage of the codified knowledge without the expert's presence. Video workstations can be used in an analogous way.

When a technician needs help with a difficult problem, he can send a video image to an expert at a central location. The expert can look at and address problems from the convenience of his office; references and files are immediately available and response can be immediate. One airline is considering stationing master maintenance engineers at centralized control cen-

ters and giving technicians video cameras. It is easy to justify video workstations if they can help keep expensive aircraft in the air.

Ultimately, one can argue that personal video workstations make sense for general business use. Time is money, and a personal communicator makes it possible to exchange ideas with others without leaving the office. Business people can instantly communicate with the person next door, on the other side of the building or around the world with nearly equal facility. Space and distance become unimportant.

The Pentagon is a perfect example of a place where video workstations make sense. Its labyrinthian halls, miles of corridors and special security impede mobility and reduce productivity. The need to react quickly in a crisis is always present. In case of emergency, users of the Pentagon's video workstations can promptly receive the opinions of staff members in different parts of the Pentagon.

The video workstation has become a practical reality. However, several factors are working against

See **Video workstations** page 37

MODERN MANAGEMENT

JAMES CARLINI

# Who's the real consultant?

*Second in a four-part series.*

Consulting is the art of telling people how to run their businesses the way you couldn't run yours when you were in their position.

Consulting is the art of selling vaporware.

Consulting is the art of making a \$50,000 project into a \$500,000 project before the client is aware of it.

Consulting is the art of getting both a fee from the client and a cut from the vendor.

Finally, consulting is the art of augmenting an organization's resources. Consultants can act as objective sounding boards or as additional helping hands on critical projects that require special skills that regular staff members do not have.

For those consultants who honestly fall into the last of the definitions listed above, hats off to you. But those who fit any of the first four definitions are exploiting clients and tarnishing the image of all consultants.

Consulting firms come in all shapes and sizes, ranging from Big Eight accounting firms to individual specialists. Sometimes, the one- or two-person firms are made up of people who developed some expertise as vendors and are now selling that expertise as consultants.

There is nothing wrong with this, except when they are hired to evaluate different products or services. Their solution for clients is always the same — buy from the vendors that they once worked for. Their reason might be that they do not understand the other available products. Or they may be getting a commission from the vendor for recommending their products. This is not consulting, and if you are paying for this, you're being robbed.

Beware of the consultant who accepts a kickback from vendors. The latest twist to this game is when the telecommunications consultant recommends a subcontractor for wiring and then demands a \$5,000-to-\$10,000 referral fee.

If you are a client, demand to see a clause in the consultant's proposal that states he will not receive any type of commission or

referral fee for recommending a vendor. If he is hesitant to add this statement, chances are that you, the client, are going to have equipment and services recommended to you that offer the greatest benefit to the consultant, not the client. Bigger does not mean better, either. More often than one might think, big firms have shortchanged their clients, despite claims of honesty. Actions speak louder than words, and the actions of some large consulting firms would make an ethical person cringe.

In order to get a large project in a metals-processing plant, a firm told one client that it managed large projects with a software-based project management program.

In reality, it did not have this capability, and when it got the job, the consultancy fabricated a project management system. It bought some software, but could not get it to work. When the client asked for some of the reports, the consulting firm made excuses such as, "We're still inputting the data," or "The printer just broke down."

It finally came up with a brilliant reason why the system did not work. The lab the data was running in had metal particles floating in the air, which kept wiping out the disk.

## Buyer beware

What about vendors who say they can act as consultant in the area of long-range planning or choosing the right system or service?

Examine the motivation behind this, and you'll discover that even when the vendor has excellent people on staff, the solution to your problem will always be tied to the product line the vendor is pushing. It may be the right solution, or it may not. Free consulting is worth what it costs. Pay for objectivity.

In telecommunications and information technologies, there are a good deal of charlatans. There are also a great deal of competent consultants who are worth many times more than what they charge. Take some time to investigate the consultants you hire.

Some firms list prior work of similar projects in their qualifications. Make sure that the consultants you are talking to

See **Consulting** page 37

Carlini is president of Carlini & Associates, Inc., a management consulting firm in Westmont, Ill.

# Features

June 30, 1986



**Digital hieroglyphics**  
From the alphabet to X.400, standardization has smoothed the evolution of communications.

Electronic messaging standards will enable users to mix and match systems to suit their needs. With vendors' support, sending E-mail across the world might eventually be as simple as making a telephone call.

**This page.**

## What's the slowdown?

The structure of Microsoft Corp.'s next version of MS-DOS will effect how local-area nets are designed and how they will communicate with other systems. While Microsoft has improved MS-DOS' ability to communicate by adding features such as file and record locking, other essential features, such as multitasking, are still in the pipeline.

**Page one.**



# Digital

*Electronic messaging  
signals continue to evolve*

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### PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.

**1 My primary areas of activity.** Circle ONE only.

I am involved in evaluating communications (data, voice and /or image) products and services:

1. for use within my own company/organization

2. for resale to other companies/organizations

3. Both

**2 For communications, my primary responsibility is:** Circle ONE only.

1. Data Communications

2. Voice Communications

3. Both

**3 Circle only the ONE title classification which most applies to you.**

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CIO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

21. Management

VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development

Data Communications

22. Supervisory/Staff

Supervisor, Head : Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management

VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development

Supervisory/Staff

Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications

41. Management

42. Supervisory/Staff

MIS/Data Processing

51. Management

VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation

Supervisory/Staff

Supervisor, Head of System Design, Analysis, Applications

Others

75. Consultant

80. Educator

85. Financial Analyst

90. Marketing/Sales

95. Other \_\_\_\_\_

**3 Job Function**

Which one of the following best describes your functional involvement with communications (data, voice, and/or video) products? Circle ONE only.

- Corporate
1. Business Management, Planning and/or Development
- Communications System/Network
2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other \_\_\_\_\_

**4 Which one of the following best describes the primary business activity of your organization at this location?** Circle ONE only.

- Consultants
11. DP/Communications Consulting Services
12. Consulting Services (except DP/Communications)

- End Users
13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/Construction/Petroleum Refining/Agriculture/Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

- Vendors
41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, Intern'l Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other \_\_\_\_\_

**5 In which ways do you typically become involved in acquiring communications products (data, voice, and/or video) and services?** Circle ALL that apply.

1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

**6 Check ALL that apply in columns A and B.**

A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

B. These products and services are presently in use at this location:

- | A                          | B                        | Product/Services            | A  | B                        | Product/Services               |
|----------------------------|--------------------------|-----------------------------|--|--------------------------|--------------------------------|
| <u>Computers</u>           |                          |                             | <u>Transmission/Network Services Equipment</u> |                          |                                |
| 01.                        | <input type="checkbox"/> | Micros                      | 18.  | <input type="checkbox"/> | Microwave                      |
| 02.                        | <input type="checkbox"/> | Minis                       | 19.  | <input type="checkbox"/> | Satellite Earth Stations       |
| 03.                        | <input type="checkbox"/> | Mainframes                  | 20.  | <input type="checkbox"/> | Local Area Networks            |
| <u>Data Communications</u> |                          |                             | 21.  | <input type="checkbox"/> | Wide Area Networks             |
| 04.                        | <input type="checkbox"/> | Communications Processors   | 22.  | <input type="checkbox"/> | Packet Switching Equipment     |
| 05.                        | <input type="checkbox"/> | Comm./Networks Software     | 23.  | <input type="checkbox"/> | Fiber Optic Equipment          |
| 06.                        | <input type="checkbox"/> | Digital Switching Equipment | <u>Communications Services</u>                 |                          |                                |
| 07.                        | <input type="checkbox"/> | Facsimile                   | 24.  | <input type="checkbox"/> | Packet Switching Services      |
| 08.                        | <input type="checkbox"/> | Modems                      | 25.  | <input type="checkbox"/> | Cellular Mobile Radio Services |
| 09.                        | <input type="checkbox"/> | Multiplexers                | 26.  | <input type="checkbox"/> | Electronic Mail                |
| 10.                        | <input type="checkbox"/> | Protocol Converters         | 27.  | <input type="checkbox"/> | Enhanced Services              |
| 11.                        | <input type="checkbox"/> | Network Mgmt. & Control     | 28.  | <input type="checkbox"/> | Centrex                        |
| 12.                        | <input type="checkbox"/> | Test Equipment              |  |                          |                                |
| 13.                        | <input type="checkbox"/> | 3270 Controllers            |  |                          |                                |

- Telecommunications
14. ☐ PBXs
15. ☐ Key Systems
16. ☐ Central Office Equipment
17. ☐ Integrated Voice/Data Terminals

**7 Estimated value of communications systems, equipment and services:**

A. which you helped specify, recommend or approve in last 12 months? Check only ONE in column A.

B. which you plan to specify, recommend or approve in next 12 months? Check only ONE in column B.

- | A                           | B  | A                           | B  |
|-----------------------------|--|-----------------------------|--|
| 1. <input type="checkbox"/> | <input type="checkbox"/> Over 10 million     | 6. <input type="checkbox"/> | <input type="checkbox"/> \$100,000-250,000 |
| 2. <input type="checkbox"/> | <input type="checkbox"/> \$5-10 million      | 7. <input type="checkbox"/> | <input type="checkbox"/> \$50,000-100,000  |
| 3. <input type="checkbox"/> | <input type="checkbox"/> \$1-5 million       | 8. <input type="checkbox"/> | <input type="checkbox"/> Under 50,000      |
| 4. <input type="checkbox"/> | <input type="checkbox"/> \$500,000-1 million | 9. <input type="checkbox"/> | <input type="checkbox"/> Don't know        |
| 5. <input type="checkbox"/> | <input type="checkbox"/> \$250,000-500,000   |                             |  |

**8 Estimated gross annual revenues for your entire company/institution:**

Circle only ONE.

1. Over \$1 billion

2. \$100 million to \$1 billion

3. \$5 million to \$100 million

4. Under \$5 million

**9 Estimated number of total employees at this location:**

Circle only ONE.

1. Over 5,000

2. 1,000-4,999

3. 500-999

4. 250-499

5. 100-249

6. 50-99

7. 20-49

8. 1-19

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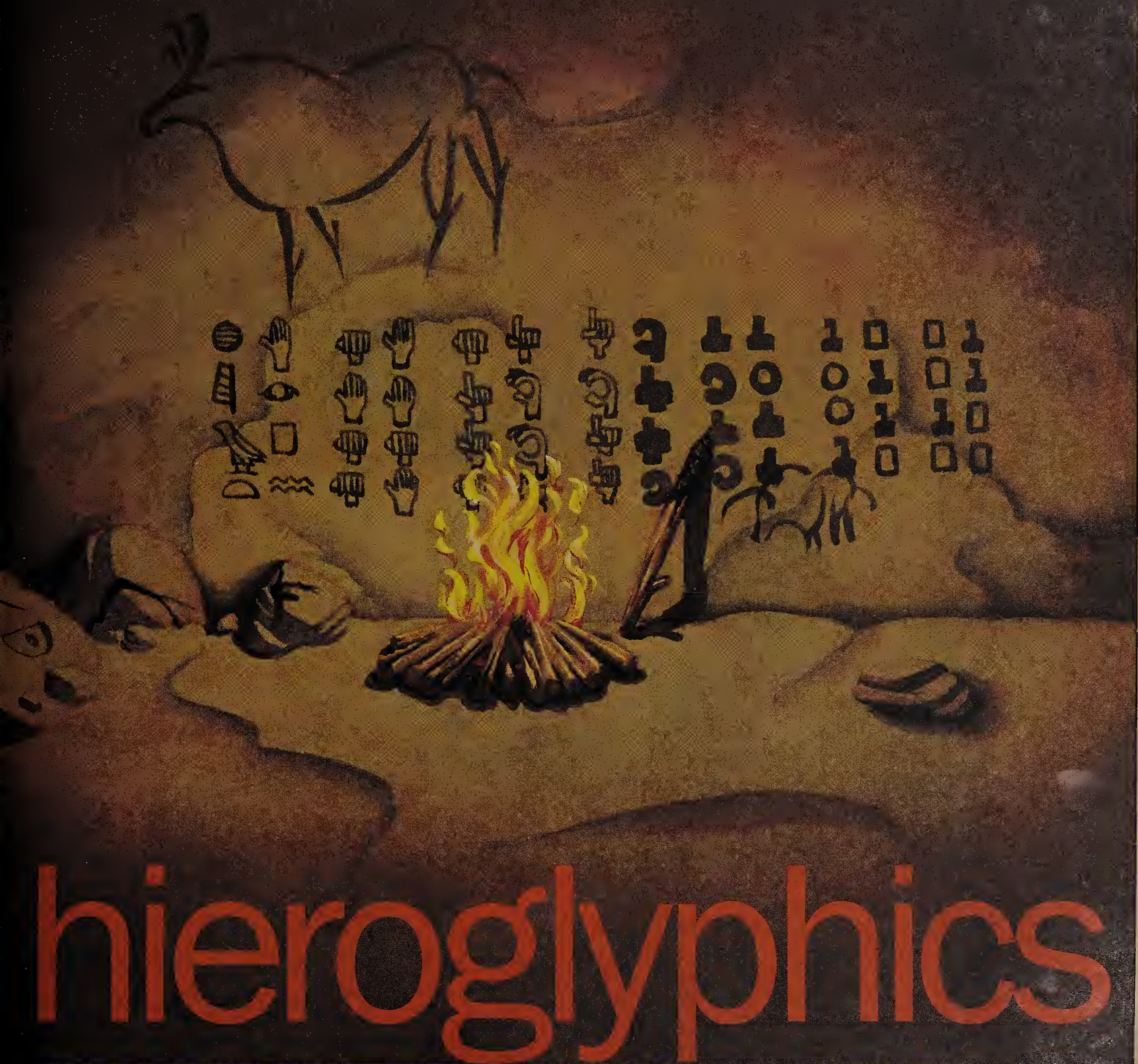
1. Supply old and new address if address has changed
2. Answer all questions
3. Sign and date form

THANK YOU.

## Network World

*The Weekly For Leading Users of Communications Products & Services*

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# hieroglyphics

**BY MARSHALL CUPP**  
Special to Network World

From cave drawings to facsimile and from smoke signals to telephones, the evolution of human communication has been driven by standards and integration. As new ways of communicating evolved, standards such as languages and alphabets broad-

*Cupp is messaging product manager for Northern Telecom, Inc. in Santa Clara, Calif. Since 1984, he has belonged to the National Bureau of Standards' Special Interest Group on Message Handling Systems.*

ened their acceptance. Users eventually integrated these standards with still newer methods to expand their powers of communication.

Standardization and integration are the principal trends in electronic communications as well. Unfortunately, the computer and communications industries have such different standards that they have hindered widespread use of electronic messaging methods. As a result, electronic mail networks are incompatible and limited.

Continued on page 32



# Does the price of optical data links for LANs scare you off?

Who can blame you? At an average price of \$150 a pair, data links aren't exactly cost effective. It's enough to frighten even the bravest LAN designer away from fiber optics.

But suppose we were to tell you there's an optical data link available right now that—in volume quantities—costs considerably less than you'd ever expect. Would that make you less fearful?

Well, take heart. Because Lytel is now delivering the most cost effective data links on the market today. Nobody else in the industry can say that with a straight face.

Now while a low price may make you a bit more courageous, it's what you get for the low price that really counts. And what you get in Lytel data links is the highest performance with absolute reliability. Predictable Reliability. And how do we assure that?

To begin with, we use a unique circuit design and packaging procedure. We have a fully automated state-of-the-art production line that's constantly monitored by the latest diagnostic and control instruments. It's probably the most efficient manufacturing facility in the industry. Result: you get the lowest cost data links at the highest performance levels. And that applies to our data links from 10 MB/s to over 200 MB/s. All of which are immediately available.

So now that you know Lytel makes expensive optical data links dramatically less expensive and predictably reliable, you needn't be afraid to consider them for your LAN designs. We're here to give you all the support you need. To get the encouraging details, call or write: Lytel Incorporated, 61 Chubb Way, Somerville, New Jersey 08876. Phone: 201-685-2000.



**LYTEL**  
INCORPORATED

From page 29

The X.400 standard may change the fractured state of electronic communications. Through enthusiastic support from users, vendors and standards makers, X.400 is becoming both a widely accepted standard and a means for integrating voice, data and image communications across diverse networks worldwide.

#### The strengths of E-mail

Electronic messaging can be a powerful adjunct to other forms of communications or can even be used as a substitute in many instances. Users can participate in E-mail conferences simultaneously, as in teleconferencing, or they can leave messages and log onto the system as their schedules permit.

Text-based E-mail conferences can be held as they occur across wide geographic boundaries, often at far less expense than that of high-bandwidth video conferences.

#### Limits to growth

E-mail can increase both personal effectiveness and overall communications efficiency by eliminating telephone tag and delays inherent in delivered mail and by allowing for a convenient time to respond. However, electronic messaging systems currently suffer from two significant constraints.

The first of these is nonuniversality. The scope of today's electronic messaging systems is limited, and communication between networks is difficult or impossible. Either there must be several intermediate file conversions or the communication must be sent as paper mail, negating the service's benefits.

As a result, many users don't use E-mail because the people they need to reach can't access it. The large number of competing proprietary systems compounds problems. Standards are needed to make interconnection possible.

Another disadvantage of E-mail networks is that many support only one type of messaging. For example, facsimile can't be sent with text. Also, some proprietary systems only support certain types of facsimile machines. This isolation prevents users from maximizing electronic messaging.

#### Strength through unity

To become a universally useful tool, electronic messaging must be integrated by type and by device, and it must be available everywhere. Only then will it be as attractive and useful as the telephone network is today.

With such integration, an IBM Personal Computer user could send a document to a Digital Equipment Corp. VAX user with attached text or voice notes explaining the latest changes in the document.

The recipient could read the notes and the document, make changes, add new notes and return it or pass it along to someone else using a different system. With integration, users will be able to have their text messages converted to digitized voice and stored on disk or tape for retrieval by telephone, to append text notes to graphics sent via facsimile or to receive images from a facsimile machine on a personal computer screen.

Integration of messaging systems will allow users to mix and match communications to meet their needs best without worrying about format or device differences. Because digitized voice, text and images are all data, standards for describing and addressing messages can cover diverse message types.

Such standards can incorporate or be supported by other popular standards and conventions, such as IBM's Document Content Architecture or Wang Laboratories, Inc.'s word processing formats. This would eventually allow communication among personal computers, word processors, minicomputers, mainframes, digital facsimile machines and voice mail systems from different vendors.

#### The evolution of a standard

Standards are the glue that can bind electronic messaging systems together into a worldwide communications network.

The X.400 standard was published in 1984 by the Consultative Committee on International Telephony and Telegraphy (CCITT). It incorporates suites, or groups of specific protocols, to provide inter-network compatibility at various levels, including message composition format envelope and addressing, thereby permitting different systems to talk to each other.

The X.400 standard operates at the sixth and seventh levels, or the presentation and application layers, of the Open Systems Interconnect (OSI) model developed by the



*“Vendor support for X.400 goes beyond the verbal support given to some standards in the past. Foregoing demonstrations of preliminary implementations, vendors are concentrating on the development of a complete set of product specifications. Likewise, X.400 vendors are working on a common implementation.”*

International Standards Organization (ISO).

European and Canadian vendors and users have already begun implementing this electronic messaging standard.

In some respects, X.400 is similar to earlier efforts at standards promulgation, like X.25. However, the organized way in which X.400 has been developed will allow it to avoid the shortcomings of previous standards efforts, which allowed a wide latitude of interpretation and did not guarantee compatibility of systems.

The X.400 standard has unprecedented support from leading computer and communications companies. More than 40 vendors are committed to the standard, including the members of the recently formed Corporation for Open Systems (COS).

COS is dedicated to making products from different manufacturers communicate harmoniously. Major domestic computer and communications vendors are members of COS, including AT&T, IBM, Northern Telecom and Apple Computer, Inc. among others.

Vendor support for X.400 goes beyond the verbal support given to some standards in the past. Foregoing demonstrations of preliminary or intermediate implementations, vendors are concentrating on the development of a complete set of product specifications instead.

Likewise, the vendors of X.400 are working on a common implementation of the standard, elimi-

nating one of the problems that have hampered standards efforts in the past. A testing facility is now being developed in Europe by the COS to test products for compliance with the specification.

Organizations that promulgate standards are also behind X.400. In addition to the CCITT and ISO, the National Bureau of Standards is vigorously promoting the standard throughout North America.

Product certification must wait for completion of testing and certification facilities. However, tested X.400 software is expected to appear during the first half of 1987. Initial software development is focused on gateways for connecting public networks with one another and to large private networks.

#### Electronic messaging's future

Consistent implementation of the X.400 standard makes communication possible across all E-mail networks, public and private, which significantly expands its reach. The development of the electronic mail standard is driven by the marketplace and by the need to make electronic mail systems compatible.

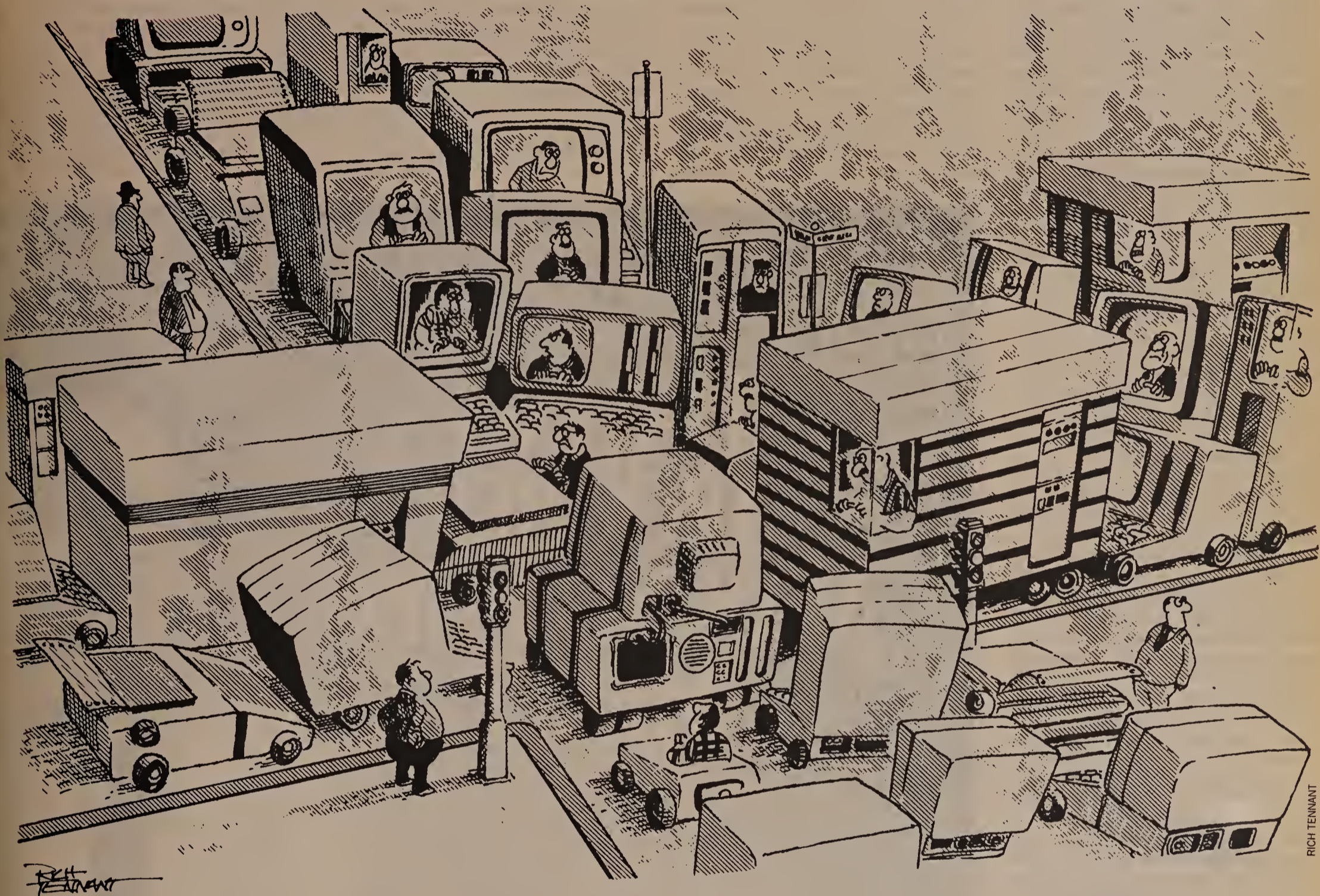
The X.400 standard has drawn together vendors, users, regulators and standards makers. It will do the same for voice, data and image communications as its support continues to spread around the globe. In turn, the benefits of integrated electronic messaging will be as readily available as those of the telephone. □

*“More than 40 vendors are committed to the X.400 standard, including the Corporation for Open Systems.”*



## FEATURE FOCUS

# What's the slowdown?



*Making inroads on local net gridlock.*

## Continued from page 1

in a gridlock, personal computer users on local-area networks are sitting in their own kind of traffic jam. They can communicate over the network, or they can run an application — but not both. They must wait to finish network communications before going back to work on their spreadsheet or word processor.

The move to connect microcomputers to mini- and mainframe computers and peripherals places demands on MS-DOS that it wasn't meant to handle.

As a result, Bellevue, Wash.-based Microsoft Corp., the maker of MS-DOS, is being forced to make significant changes to its ubiquitous operating system for personal computers (see story on page 34).

Originally designed for single users, MS-DOS has already evolved to

include basic network-related features such as file and record locking.

Historically, operating systems have evolved separately from networks. However, the trend toward interconnection is forcing computer vendors to retrofit their operating systems with network hooks, or support for networking functions, according to Eric Killorin, president of Hyatt Research Corp., an Andover, Mass.-based firm that publishes the *PC Netline*. The closer the workstation and network operating systems, the greater the synergy, he observes.

### Major push for standards

Both Microsoft and IBM have made major contributions toward standardizing system software for personal computer networks. By having the operating system handle file, record and byte locking (byte locking begins and ends at

specified bytes), Microsoft helped the local net market move from simple disk sharing to file sharing.

In addition, DOS 3.1 and the Redirector, Microsoft's optional server program, allow applications developers to write programs that are independent of network hardware.

IBM's major contribution to local-area networking standards is Network Basic I/O System (Netbios), a part of MS-DOS 3.1 that was announced in August 1984 along with the IBM PC Network Adapter.

Netbios is analogous to the Basic I/O System in personal computers; where the Bios acts as an interface between an operating system and a computer's hardware (I/O ports, storage systems and video display), Netbios acts as the interface between an operating system and the local-area network adapter card or other network hardware.

Continued on page 35

► MICROCOMPUTER TRENDS

## Tales of the expected

*Users look ahead to Microsoft's MS/DOS 5.1.*

Both microcomputer users and the micro industry are looking to Microsoft Corp. for clues about what the next version of MS-DOS, Version 5.1, will bring. The Redmond, Wash.-based software developer is committed to developing an operating system that exploits new hardware, specifically Intel Corp.'s 80386 microprocessor, according to David Melin, Microsoft's product marketing manager for networking operating software. That means being able to take advantage of more memory and operate at faster speeds, he says.

Microsoft previously committed itself to giving DOS multitasking capabilities, which Melin defines as multiple tasks executing simultaneously on one personal computer. This will help break the traffic jam resulting from the current single-tasking operating system. Melin adds that Microsoft will also beef up MS-DOS by adding more networking capabilities.

"Our approach will be to integrate more network functionality into DOS," Melin notes. "It makes sense for DOS to support network primitives." These primitives include file locking, which prevents two users from writing to the same file at the same time, and redirecting functions, where calls to files and peripherals are redirected from the microcomputer and its local resources to network resources. In the long term, the distinction between a stand-alone workstation operating system and a network operating system will diminish, he says.

Microsoft now bundles many networking functions into a separate product called MS-net. Melin notes that one component of MS-net, the Redirector, was developed as part of MS-DOS and has been broken down and sold separately for marketing reasons. Along with the Redirector, which is a server program, MS-net contains approximately a dozen utilities, such as print spooling and help service.

Not everyone needs networking capabilities, and making these features standard in MS-DOS would only make the operating system unacceptably large, Melin says. Just by adding basic hooks to support networking, he explains, MS-DOS swelled from 24K in Version 2.0 to 36K in Version 3.1. However, DOS's size may become a moot point if Microsoft can provide users access to several megabytes of memory and offer memory caching.

Like most vendors, Microsoft doesn't like to talk about unannounced products. Without committing to delivering such a product, Melin described the key elements of a generic network operating system. At the lowest level, the network operating system must coordinate network traffic, he says. This level provides support for multiple users in the form of

file, record and byte locking, as well as access control. MS-DOS 3.1 currently provides these capabilities.

On the second level, a network operating system redirects traffic, knows where files are located and handles routing tables. The third level, which Melin refers to as network optimization, encompasses memory caching, special security and performance tricks such as reading ahead and writing behind,

a type of caching where the server saves the file when it has time.

An operating system with features from Levels 1 through 3 allows stand-alone applications to run on the network, Melin notes. However, Level 4, which provides process-to-process communications, requires that distributed applications be written. At this level, the network operating system handles the execution of remote procedure calls. Part of the software

runs on the server and part runs on the nodes, so the operating system needs the capability to transmit a line of code across the network.

"It's a tough piece of software to write, and the demand's not there," Melin says. The key benefit to users is the ability to have mini- and mainframe-like data base control on their microcomputers. Melin anticipates that this capability will be available in a couple of years.

— Mary Petrosky



From page 33

Although MS-DOS supports multiple users in a network environment, Microsoft denies that MS-DOS will ever become a multiuser operating system (one processor shared by multiple users).

David Melin, Microsoft's product marketing manager for networking operating software, notes that hybrid multiuser systems exist where multiple processors physically located in one housing are shared by multiple users.

#### Emulating minis

Many industry insiders see MS-DOS gradually becoming more like a minicomputer operating system. Minicomputer systems software accommodates multiple users and of-

fers features such as multitasking and file and record locking that are needed in networking software.

However, key differences exist between network operating systems and minicomputer operating systems.

A minicomputer is easily managed because control is centralized in one box, but a network, which is a distributed system, is more difficult to manage. System accounting is one major difference between the two operating systems, according to J. Scott Haugdahl, senior systems specialist at Architecture Technology Corp., a Minneapolis-based consulting and educational group.

A mini will maintain a record of all system resources as they're

used. Network operating systems generally lack such an audit trail because of the high overhead in tracking network traffic.

However, as larger networks are installed, having access to statistics on current users and network use is becoming a necessity. In addition, transaction processing, where a server can back up a number of disk reads and writes in case of a system failure, is becoming increasingly desirable.

#### One operating system or two?

As local-area networking for micros evolves, two approaches to systems software have emerged. One approach, best characterized by independent local net vendor Novell, Inc.'s Netware, uses two op-

erating systems: MS-DOS for the workstation and a separate, proprietary operating system for the network file server. The second approach is to incorporate networking functions and stand-alone workstation functions into a single operating system. According to Melin, Microsoft favors the second approach.

Melin points to Apollo Computer, Inc.'s Domain system as the right way to build an operating system. In 1980, the Chelmsford, Mass.-based manufacturer of engineering workstations decided it wanted an operating system that featured the centralized filing of a time-sharing system and the computing power of networked workstations.

Apollo's Domain system was designed specifically for a work group environment, says Mark Hatch, Apollo product group manager for networking and operating systems.

As such, the network is viewed as a system bus, which helps keep system administration simple, he says. For instance, the Domain system provides a single password file, called a registry, that ensures a consistency of file access, and therefore security, across the network, Hatch says. All workstations on a Domain network run the same networking facilities and communicate on a peer-to-peer basis with other network nodes.

IBM agrees with Microsoft's decision to go with one integrated operating system. IBM chose to implement local-area nets as an extension to PC-DOS, in part to protect users' investments in software, according to Bob Baden, product manager of new personal computer product programs at IBM's Information Systems Group in White Plains, N.Y.

Baden notes that the key advantage to a single operating system is that software developers don't have to write different versions of their programs for stand-alone and multiuser environments. Applications written for PC-DOS 3.1 will run in either mode.

#### Opposition to DOS networking

Although IBM and Microsoft's commitment to building networking into DOS carries substantial weight, not everyone in the industry thinks this is the right approach. Architecture Technology Corp.'s Haugdahl says a single operating system can't perform both workstation and network functions well. He says a network operating system running on a server, unconstrained by DOS, offers better security.

According to Haugdahl, a separate network operating system makes it difficult for individual users to gain unauthorized access to files, since DOS utilities typically used to skirt security mechanisms are ineffective. For instance, the network operating system might format a server disk differently than DOS, making it impossible for the workstation user to reformat the server.

In addition, separate network systems software makes it easier to  
Continued on page 36

You say you have terminals and computers spread all over the building. There are far more users than available computer ports. You need to provide high-speed data links to remote sites. And your boss wants to know why computers and terminals can't talk over the same telephone wiring he does. Is that what's troubling you?

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From page 35

upgrade network features, because only software must be purchased for the servers, Haugdahl says. He contrasts this with the approach of a single operating system distributed across the nodes of the network; upgrading the network often means new software for every workstation on the local net. Haugdahl adds that this can be a daunting proposition in a large network.

The all-in-one approach also spells trouble for performance, Haugdahl notes. His sentiment is echoed by Craig Burton, Novell's vice-president of marketing. Currently, MS-DOS is single-tasking and single-threaded, which means it can only perform one task at a time in sequential order, Burton says. Along with adding multitasking capabilities to MS-DOS, Burton believes Microsoft might make DOS multithreaded.

Multitasking lets users perform several tasks on one processor simultaneously. Multithreading lets the operating system handle interrupts on a priority basis, rather than sequentially (an interrupt is a request for the attention of the CPU that temporarily takes precedence over the current process).

Although these changes would be beneficial from an application standpoint, Burton says adding a lot of code could negatively impact the server's performance.

Despite Microsoft's intention to increase DOS' networking capabilities, Haugdahl predicts that separate network operating systems will continue to exist. He expects vendors such as 3Com Corp. and Novell to focus on performance and network management issues. These vendors are free to change their network operating software any way they like, and they only need emulate DOS calls, he says. Microsoft, on the other hand, can't change DOS radically without substantial user backlash.

"Despite advances in technology, the vendors are going to have to maintain 100% compatibility," Haugdahl says.

#### Room for improvement

When asked what costs users might encounter due to the evolution of DOS and network operating systems, Haugdahl and others point to training as the only significant cost. Major software developers are likely to offer network versions of

their single-user applications, which will cut down on training problems, Haugdahl says. However, there will be some new commands and capabilities to learn that will require support.

Don't expect radical changes overnight. It takes 12 to 18 months to take advantage of new operating system features, according to Novell's Burton. Regardless of changes to DOS, Bur-

ton says speed, reliability and connectivity to other systems are three areas where network operating systems can be improved.

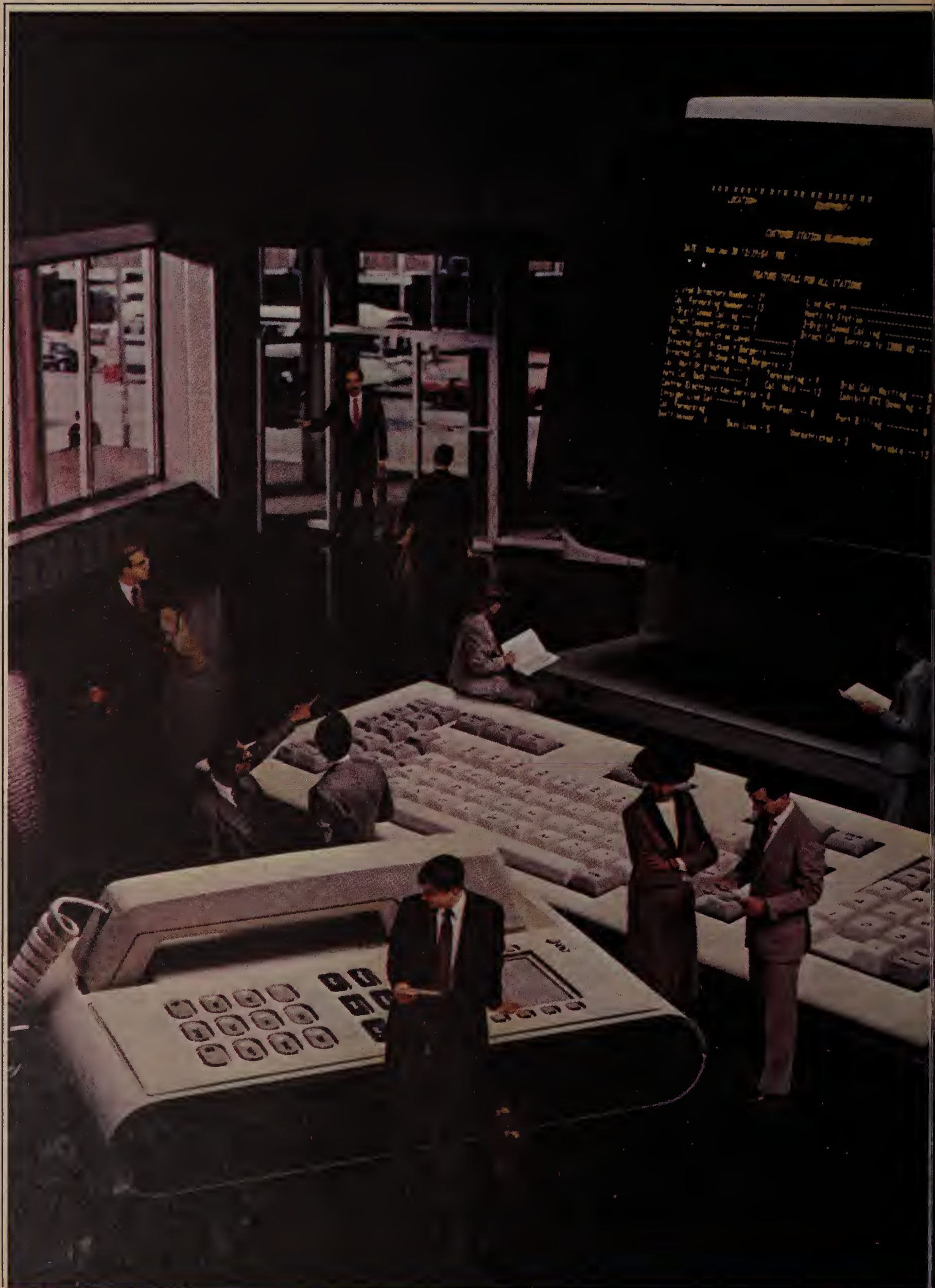
Providing the gateways and bridges necessary for internetworking is among the most pressing of network issues, agrees Bob Bressler, vice-president and general manager of 3Com's Applications Software Division. However, he believes

network management is more important than performance in large networks. "I think network management will become one of the keys, if not the key, in decision-making," Bressler says. Currently, local net management is in its infancy, with existing products giving little information beyond the number of bits.

Although important

changes are in the wind for microcomputers and the networks used to connect them, the micro user has it easy. Essentially, the micro world is a homogeneous environment. Tougher network questions arise concerning interconnectivity. **Z**

*Next week, part two will address cutting across operating systems to connect heterogeneous equipment.*



### Video workstations from page 27

its rapid adoption. First, the cost of installing video workstations is high. While prices are expected to come down sharply, a high-quality workstation now costs between \$10,000 and \$15,000. Cable television channels dedicate 6M bit/sec to their signal. The standard for digital transmission of full-motion color

video is 1.544M bit/sec.

The biggest obstacle is probably the lack of a communications infrastructure. Full-motion color video channels are just not available to companies at most locations, and when they are, video channels are rarely linked into individual offices.

Until users have the opportunity to try video workstations, there is

bound to be some reluctance to use them.

Coder/decoder technology provides a compression of video images over smaller bandwidth pipes. Some cable TV networks already provide a video option for businesses, and broadband local-area networks are being installed. The technology for video workstations is here and is proven. But while cost and communica-

tions are factors that will continue to inhibit growth in general office use, the savvy communications manager will identify specialized applications where video workstations make sense.

For now, the video workstation is a special technology with limited applications, but it is one communications professionals should take seriously. **□**

### Consulting from page 27

actually worked on those projects.

Many times, the consultants who worked on those projects are at a different office or have left the organization.

A firm's qualifications are great, but it is not going to help you as a client if the person working on your project did not participate in those projects.

Establishing fees is not an easy task for any consulting firm.

Hourly, daily or fixed fees are some of the ways to charge a client.

If approached by a firm that wants to charge a fee based on a percentage of savings, exercise extreme caution.

This type of fee setting is ludicrous, yet every year, there are clients who entered this type of agreement for long-distance savings or general telecommunications cost savings.

*“Setting  
fees is  
never a  
very easy  
task for  
anyone.”*

Percentage-of-savings fees give the consultant a percentage of the first year's savings.

The fee might be equivalent to the first six months of savings or half the first two years' savings or so on.

The problem with this approach is that the consultant can tell clients to cut out vital services that support their operations because the more the consultant saves, the larger his fee.

Another concern is that the dynamic environment of certain areas, such as long-distance, are so volatile that what may be a cost-effective solution today can turn out to be more costly in a few months.

What happens to the percentage-of-savings fee formula then? Will the consultant pay back for the increased cost? Don't count on it.

Searching for consultants who have integrity is becoming a full-time job.

*Next month, part three of this series will take a close look at vendors. **□***

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The right choice.

**Gateways from page 26**

the capability of background processing vary.

To some companies, a programmable interface is important. Such an interface provides hooks into mainframe communications. Using those hooks, an application programmer can do things such as create sophisticated background operations that continue running while the user is doing something else.

An application, for example, might need information from several mainframe sources.

The user could simply request the information and go on to another task, while in the background mode, the program would set up the appropriate connections, access the information and deliver it to the user's screen.

Many personal computer users need the capability to transfer files, even if most of their work is in an on-line 3270 environment.

IBM's Systems Network Architecture gateway products usually support file transfer through a variety of methods. The simplest method is to print to a hard disk instead of a printer.

In addition, users can support file transfer capability through the interface, or they can emulate remote job entry, which is a basic file transfer protocol.

Some gateway software supports downloading of files, but not uploading, and others support both.

It is important that gateways support faster transmission rates, because users are growing accustomed to the multimegabit speed of their local-area nets.

The maximum speed for current dial-up connections is normally 4.8K bit/sec, and there are some 9.6K bit/sec systems starting to appear.

Leased lines are typically 9.6K bit/sec. On the other hand, the standard maximum for current gateways is 19.2K bit/sec, and several gateway companies are offering 56K bit/sec transmission rates.

Speeds of 56K bit/sec and higher will undoubtedly be widely used in the near future.


End users will be a driving force behind this movement toward higher transmission rates. Companies will move to higher speeds to reduce the cost of high-volume traffic.

Emulation cards will continue to be used where group connectivity is not an issue.

Despite advantages in terms of communications management and per-user

cost, using local-area net gateways can't compete with already purchased emulation hardware.

Gateways are, however, generally the right choice to connect new local-area nets to host systems.

Choosing from among the various gateways is a matter of understanding the diversity of gateway products and choosing the one with the appropriate features. 

**Dole from page 6**


seemed to be aware that their primary responsibility is to provide efficient, high-quality phone service," Compitello claimed.

The Computer Business Equipment Manufacturers Association (CBEMA) opposes the legislation. "We are pro-competition in the industry, but we are opposed to the timing of the bill," CBEMA spokeswom-

an Charlotte LeGates said. "We feel Congress should have waited for the conclusion of the [Modified Final Judgment] study that Justice is expected to issue in January 1987."

Representing the BOC viewpoint, Bell Atlantic Corp. Vice-President of Federal Relations James Schaubel said the FCC is the proper forum for telecommunications regulation.

"We have been trying to serve three masters under the current structure," he said. "This has created a great deal of confusion."

Schaubel said that despite opposition belief to the contrary, if the FCC were to free the BOCs to enter new businesses, they would be able to establish new revenue sources and take the pressure off local ratepayers. 

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**Controller from page 1**

When used to support IBM's family of 3270 display stations, including newly released models, the 3174 can use standard coaxial cable, shielded twisted-pair wire and telephone-type twisted-pair wire. Both types of twisted-pair wire are available in IBM's Cabling System, but existing telephone wire of good quality can also be used, ac-

cording to Ed Scharmer, 3174 product manager.

The controller is outfitted with previously developed dual purpose connectors that support both coaxial cable and shielded twisted-pair wire. This will simplify the customer's job of ordering parts and configuring the controller, Scharmer said.

Dual-purpose connectors eliminate the need for ba-

luns, which are small converters that enable coaxial cable-based devices to use shielded twisted-pair wire. Use of baluns limits the maximum permissible distance between terminals and controllers to 2,000 feet. However, the dual-purpose connectors enable shielded twisted-pair wire. Use of baluns limits the 5,000 feet, the same as standard coaxial cable.

To realize even greater distances between terminals and controllers, the 3174 supports the previously announced 3299 terminal multiplexer, including a recently upgraded version that uses standard telephone wire.

The 3299 provides eight terminal ports through a single controller connection. Model 2 of the 3299 improved on Model 1 with

the addition of the dual-purpose connectors. Removing baluns extends the maximum distance between terminals and hosts from 4,000 feet to 10,000 feet — 5,000 feet between the controller and the 3299, and 5,000 feet between the 3299 and the terminal.

Model 3 of the 3299 was announced with the 3174. The device is connected to the controller with coaxial cable or shielded twisted-pair, like the Model 2, but has RJ-11 modular telephone jacks on the terminal side. "Most offices are wired with four-pair twisted wire," Scharmer explained. "The telephone only uses two pairs, so you can use one pair to attach a display." That pair can be picked up in the telephone wiring closet, terminated with an RJ-11 and snapped into the back of the 3299.

Terminals are linked to the twisted-pair using a Coax-to-Telephone Twisted-Pair Adapter jointly developed with Rolm Corp., IBM's wholly owned communications subsidiary. Terminals must be within 900 feet of the 3299.

The 3174 can be attached to IBM's Token-Ring Network in two ways. A controller channel attached to a host can be interfaced to the ring and act as a gateway between devices on the ring — including other 3174s — and the host.

Alternately, the Token Ring can be used to connect remote controllers to IBM hosts through the previously announced 3725 front-end processor subsystem.

Terminals are not connected to the controller over the ring; they are wired directly to the controller in one of the ways outlined above. Attaching terminals to the ring would require a different adapter for the controller and a ring protocol adapter for each display, Scharmer said. "You would get into a ring protocol just to use the same cable, but we can already do that with the Cabling System," he said.

Asynchronous Ascii devices are also wired directly to the controller. The larger 3174 Model 1LS and 1RS can support up to 24 RS-232-C ports, and the smaller 3174 Model 51 and 52 can support eight ports. Asynchronous terminals and hosts have to be within 50 feet of the controller or connected with modems.

A plug-in adapter enables 3270-type terminal users to access asynchronous applications and allows asynchronous devices to access 3270 synchronous applications. □

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# Calendar

**June 29-July 3, Norfolk, Va. — 15th Annual ACUTA Conference.** Contact: Association of College and University Telecommunications Administrators, 211 Nebraska Hall, Lincoln, Neb. 68588-0523.

**June 30-July 1, Crystal Lake, Va. — The Postdivestiture Tariffs and Their Impact on Large Networks.** Contact: The Aries Group, Inc., 1500 Research Blvd., Suite 320, Rockville, Md. 20850.

**July 7-9, Washington, D.C. — Deregulated Centrex vs. PBX: Positioning Network Intelligence, User Choices and CPE Vendor and BOC Strategies.** Contact: Telestrategies, 1355 Beverly Road, McLean, Va. 22101.

**July 7-11, Washington, D.C. — Electronic Warfare, C-cubed Systems.** Contact: The George Washington University School of Engineering, Washington, D.C. 20052.

**July 8-10, Baltimore — Hands-On Data Communications: An Advanced Approach.** Also, July 14-16, Las Vegas, Nev.; July 21-23, Chicago and Sacramento, Calif. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07904.

**July 9-11, Boston — Data Communications I — Basic Concepts.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521-2939.

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## ► MANAGEMENT

# Teaching telecom

*A new curriculum.*

BY MARGIE SEMILOF

Senior Writer

SAN FRANCISCO — Golden Gate University here last week created what administrators said is the nation's first School of Telecommunications Management.

Officials said increased enrollment in the university's telecommunications degree program, currently offered by the School of Business Administration, provided the impetus for the action. The university has been churning out telecommunications management graduates since 1975. The communications curriculum focuses primarily on management issues, rather than on the technical aspects of telecommunications.

There are currently 600 students enrolled in the program, which offers 30 master's and bachelor's degree level courses. The telecommunications management program graduated 64 students with master's degrees and three students with bachelor's degrees this semester. The university also offers courses to Bay-area communications professionals.

"The program has reached a point where it needs its own administrative structure," said Golden Gate spokesman Jay Goyette.

The school's dean will be James Koerlin, a former communications manager with Pacific Telephone Co. and Lucky Stores, Inc. □

## Marietta from page 1

1,000 ports with the option to expand. The division's voice traffic is handled by a larger Northern Telecom SL100 PBX, located in a nearby Waterton, Colo., facility.

About half of the SL1's communication is computer-to-computer, although there are approximately 200 terminals and IBM Personal Computers and Apple Macintoshes emulating terminals that communicate through the PBX. Martin Marietta and Northern Telecom jointly developed a so-called silent card to permit host-to-host communications.

"Most switches typically deal with terminals that communicate with a host computer," Strand said. "In a computer-to-computer application, the computers don't react with each other in that same way. We want the switch to be transparent to the computer connection."

Strand said every node in every office and cubicle is wired for data through the digital switch. Users can connect to other networks via bridges and gateways or to another computer in Martin Marietta's network. Modems are connected to the switch so users can dial out of Martin Marietta's facility to external resources.

Another benefit of using the SL1

# Letters:

## Article long on pizzazz

I find *Network World* to be editorially sound, containing articles that are useful and factual. Therefore, I was disappointed by the front-page article on the ICA Conference ("Lackluster ICA short on pizzazz," June 9).

As an ICA member, I was very pleased with the conference, as were all other ICA members with whom I talked. Contrary to the article's statements, it is quality, not quantity, that both attendees and vendors expect from the ICA conference.

As an attendee, I found the quality of the technical sessions and the exhibits to be the best ever. I attend the conference for its educational value, not its "pizzazz."

Richard A. Colby  
manager, corporate telecommunications  
Johnson Controls, Inc.  
Milwaukee, Wis.

A front-page story headlined "Lackluster ICA short on pizzazz" attributes "disappointment" to the vendors and attendees of the ICA annual conference in Atlanta. I am hard-pressed to believe that there was widespread disappointment by vendors or attendees.

On the contrary, this was one of the best exhibitions in which I have participated in my 13 years of active membership with the ICA.

A gathering of the ICA's 1,500 members gives vendors a unique opportunity to display their wares. Telecommunications vendors appreciate the opportunity to display their products and services in front of an audience of this caliber. Quality is the issue here, not quantity. Filling an exhibition hall with tire kickers, the idly curious and gadget collectors is of no value to the ICA or to the vendors who display there.

I doubt very seriously if Lautenbach of IBM, Olson of AT&T, Admiral Hopper of the U.S. Navy or McGowan of MCI Communications Corp. came to the ICA looking for pizzazz.

Unfortunately, none of these issues were touched on in the article, which emphasized glitz, glitter and hype, or the lack

thereof. The article inaccurately portrayed the conference, and might better have been printed in *Variety*. The author did us all a disservice by not delving deeper into the conference, the association and the participants, and his style might be better suited covering opening nights and premieres.

Douglas C. Caffrey Fields  
corporate manager  
telecommunications planning  
Key Services Corp.  
Albany, N.Y.

I read your article about the ICA conference in the June 9 issue of *Network World*. While I agree that the conference may have been short on pizzazz, I definitely take issue with the use of the term "lackluster." ICA is not interested in pizzazz, but we are certainly not lackluster when it comes to learning our trade.

We've had all the product announcements we need; our job now is to put it all together. AT&T has torn the industry apart and our corporate vice-presidents do not send us to ICA to come back with a batch of new announcements, but rather to educate ourselves in order to do a better job. ICA fulfills that need beautifully.

Ed Sause  
ICA member  
Teaneck, N.J.

## Packet net reaction

In regard to "Padding the Packet Net" (*Network World*, May 19), the author did not clearly describe the X.25 packet assembler/disassembler environment in the following areas:

1. There was no mention of Memotec Datacom PADs either in the article or in the comparison chart. We have been dealing with the Memotec organization for several years, have several of their units installed and have found them to be one of the best in this area.

2. The author states that "once within the network, each addressed packet seeks the best route to its destination." While this may be true of some specific vendors, it is not true industrywide. Many vendors establish a virtual path at call setup, and they maintain that path for all

packets exchanged between Point A and Point B (unless the path becomes unusable).

3. "Compared with point-to-point or multidrop leased-line data networks, packet networks are less expensive, more reliable and less error-prone." More reliable? Yes! Less error-prone? Yes! Less expensive? In fact, it may be more expensive, depending on the size, configuration and basic layout of your network.

4. PADs "are not a necessary component of public networks. Public data networks are usually accessed through dial-up links. . ." Yes, and the dial-up links are attached to PADs of some sort.

5. One point not brought up is the value one can get from running 3270 binary synchronous protocol over a packet network. Aside from reliability, it allows the user to establish sessions with a number of hosts attached to the packet network, instead of simply to the host normally on the other side of the cluster controller. Some PADs, such as the Protocom Devices unit, even allow the user to set up several concurrent sessions with different hosts, with the ability to switch among them with a keystroke.

Edward Woods  
telecommunications manager  
Citibank, N.A.

## Local nets are no threat

Your article titled, "Managers Fear Local Net Nightmare," (*Network World*, June 16) references National Gypsum Co. This article states that one of our MIS directors lost his job because of difficulties with a local-area network.

As the head of information systems for our corporation, I ask you to retract this error. No director, manager or employee of National Gypsum or any of its divisions or subsidiaries has ever lost his or her job for anything relating to a local-area network.

Alan G. Merritt  
general director of information systems  
National Gypsum Co.

*Network World stands by the account as related by a source within National Gypsum.*

in this data application is the switch's ability to automatically adjust to a variety of line speeds. The PBX is able to support 1.54M bit/sec T-1-type rates, 9.6K bit/sec terminal lines and low-speed 1,200 bit/sec asynchronous traffic.

Strand said one potential problem involved in passing all data through a central facility is the threat of creating a single point of failure.

To guard against that, Strand

said, users should consider building redundant configurations. Martin Marietta's PBX is equipped with dual power supply and an additional battery backup.

He advises users considering a similar application to maintain spare line modules and system components for quick change-outs in the event of a system failure. The SL100 at the main facility is also completely redundant.

Martin Marietta will eventually

turn the SL1 into a local-area network system using Northern Telecom's Lanstar local net software. The company may also use the switch for voice applications simply to stretch the use of the PBX to its full capacity.

"The use of PBXs for local-area networking is untested," Strand said. "We are not sure how it will work. In theory, however, it should operate as well as any local network." □

## ► COMPARATIVE REVIEW

# Service units make vital connection to T-1 and DDS

*Paradyne and Penril DataComm data and channel service units pair up to provide terminal-to-facilities link and to perform grab-bag of services.*

BY JOHN J. HUNTER

Contributing Writer

As the cost of dedicated telephone lines increases and the quality decreases, network managers are on the lookout for the most cost-effective ways to transmit data. The managers with lots of data and money have opted for the all-digital AT&T Accunet T1.5 service. The others have moved to the older Accunet standby, Dataphone Digital Service (DDS).

Connecting to T-1 or DDS, however, involves the use of two products with which many telecommunications managers may not be familiar: the channel service unit (CSU) and the data service unit (DSU). These units work in pairs. Together they are the vital link between terminal equipment and communications facilities (see chart).

Although DDS/T-1 subscribers may use separate DSUs and CSUs, most have opted for a combined unit. Two such units are the Paradyne Corp. 3056/DDS and the Pen-

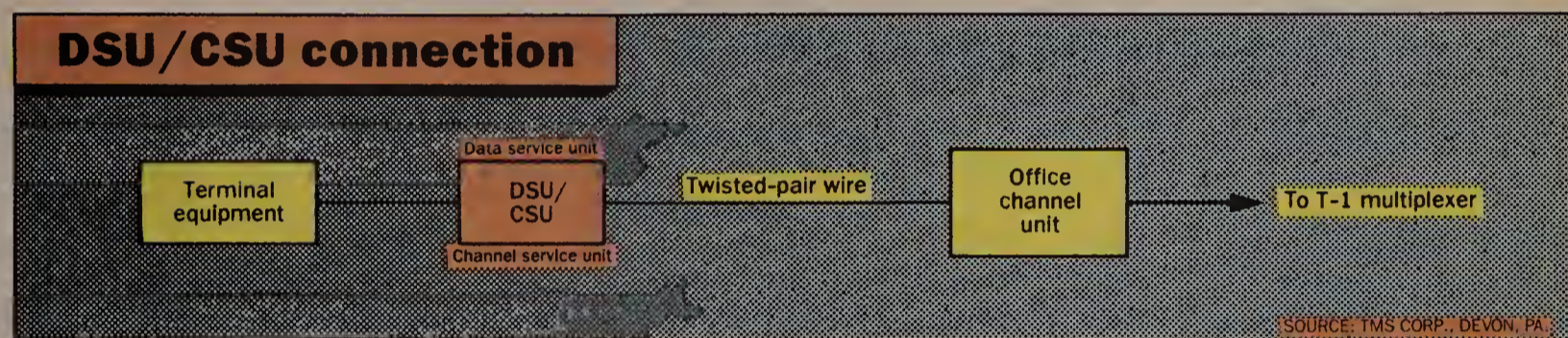
rice and transmitted over one 64K bit/sec channel. With subrate data, 48K bit/sec contains user information, 8K bit/sec is used for framing and 8K bit/sec is used for control codes. The 56K bit/sec rate does not require framing, but it does need 8K bit/sec for control codes. Both products also meet the digital data system channel interface specifications.

including the subscriber's DSU. The Abats line loop-back test returns the bipolar signal from the remote CSU. Its digital loop-back test checks the entire network back to the remote DSU's terminal equipment interface.

Because the test data is looped back through the DSU, the test center can verify the data after it has been decoded, reclocked and re-

erating with DDS II, while the Penril unit is not.

The Paradyne and Penril units can be used in point-to-point and multipoint DDS environments, and both can be employed as limited-distance modems. For the latter application, the 3056/DDS can be fitted with an optional asynchronous data interface that accepts input from 1,200 to 19.2K bit/sec. Be-



When used in the DDS environment, the output from the CSU/DSU is transmitted to the telephone company's central office via a twisted-pair unloaded local loop. The data is passed to an office channel unit (OCU) that formats the data into a 64K bit/sec signal, which is passed to a T-1 multiplexer. In addition to the user data, which accounts for 56K bit/sec, the signal output from the OCU also contains framing and signaling information that the DDS needs.

Asynchronous input cannot be directly accommodated by either product in a DDS environment. Such input requires either oversampling, an asynchronous-to-synchronous converter or an external multiplexer. With oversampling, the asynchronous data is clocked at four times the actual data rate. However, the output of the CSU/DSU contains only one user bit in four, with the other three being clock bits. Obviously, this is not the most efficient way of handling asynchronous data. The converter and multiplexer produce clean synchronous outputs but add cost to the overall system.

Both vendors have done a good job with diagnostics. Standard tests performed include self-tests and loop-back tests. The loop-back tests operate with the OCU, which generates commands that place the CSU into line loop-back and the DSU into digital loop-back test modes. The line loop-back requires the CSU to return the received line signal to the central office's OCU.

Both products are compatible with AT&T Communications, Inc.'s Automatic Bit Access Test System (Abats). Abats test centers operate in conjunction with local facilities and can check the entire network,

transmitted. The built-in standard CSU/DSU tests are all in-band and thus reduce data throughput. The Abats tests can interrupt data flow.

Although Paradyne has not solved the in-band test problem, the 3056/DDS alleviates it with its remote test channel facility. This option adds a dial-up diagnostic modem to the CSU/DSU that permits the user to run diagnostics while data continues to flow to it. This permits the user to determine if the CSU/DSU or the line is having the problem. Such a facility will

cause oversampling is not required, the 3056/DDS is more efficient than the Penril unit for this application.

Both products will operate stand-alone or rack-mounted. The slim design of the CSU/DSU 56 permits 16 cards to fit into a standard rack, while the bulkier 3056/DDS fits only eight. The CSU/DSU 56 carries a single-quantity purchase price of \$995, and the 3056/DDS sells for \$1,195.

With the addition of the remote test channel, the price zooms to \$2,385. The asynchronous data handler costs \$150.

When it comes to overall features, the 3056/DDS is the clear-cut winner. Whether or not the user needs all of them is another matter. The basic units provide essentially similar services, making the \$200 price differential of the 3056/DDS hard to justify. Yes, the product is DDS II-compatible, but that service still isn't available.

The Paradyne unit can also handle asynchronous inputs directly when the product is being used as a limited-distance modem. That's a nice feature, but it would be foolish to use a product as expensive as this as a line driver.

The other selling point of the 3056/DDS is the optional remote test channel. That unit permits the separate testing of the CSU/DSU and the line without interrupting data flow, and that's a real plus. However, Abats will do the same thing, although it can interrupt data flow, and AT&T will have a hard time arguing the results of the test. Cost figures for Abats were unavailable at press time. If it is excessive and extensive test facilities are a requirement, the Paradyne unit is the only game in town. □

*“Connecting to T-1 or DDS requires the use of the channel service unit and the data service unit.”*

*“A dial-up diagnostic modem will go a long way to reduce the finger pointing that happens all too frequently.”*

ril DataComm Co. JSU/DSU 56. Both products accept synchronous input at speeds of 2,400, 4.8K, 9.6K and 56K bit/sec. Each outputs data at the DDS primary rate of 56K bit/sec plus the subrate speeds of 2,400, 4.8K and 9.6K bit/sec.

The DSU and CSU perform different services. The DSU converts the signal from the terminal equipment into the bipolar format required for DDS and T-1. In contrast, the CSU performs line-conditioning functions such as equalization and signal reshaping as well as line loop-back testing.

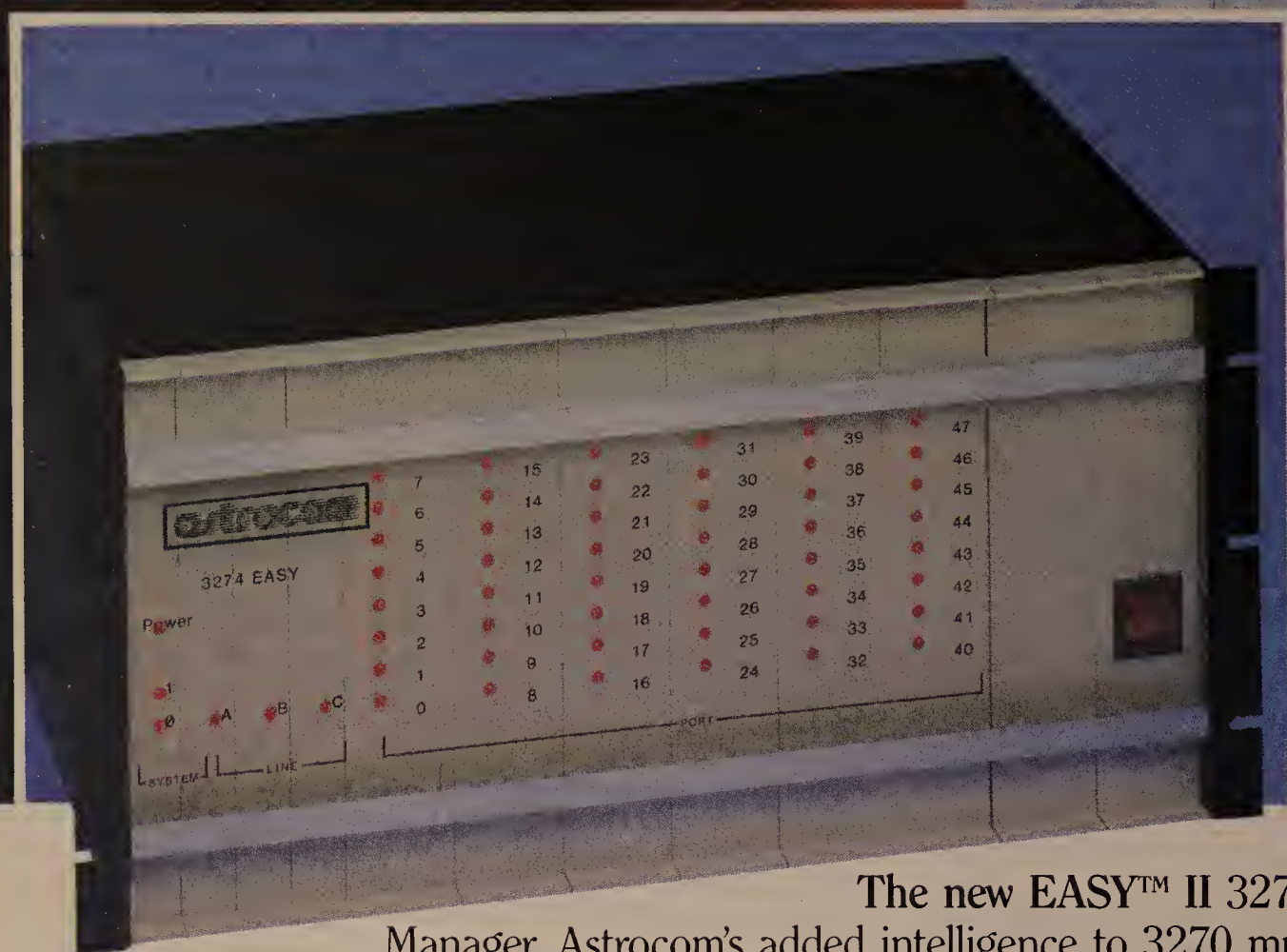
The subrate data is grouped at the telephone company central of-

Hunter is president of TMS Corp. in Devon, Pa.

go a long way to reduce — though probably not eliminate — the finger pointing that happens too frequently when multiple vendor equipment is used in a network.

When AT&T ever gets around to implementing its DDS II service, a separate diagnostic channel will be provided to handle tests and monitoring and to eliminate overhead. The Paradyne unit is capable of op-

# MEET THE MANAGER.



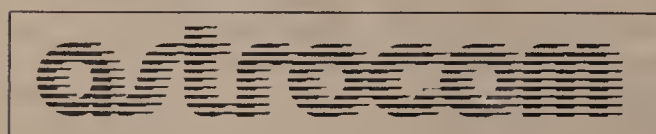
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